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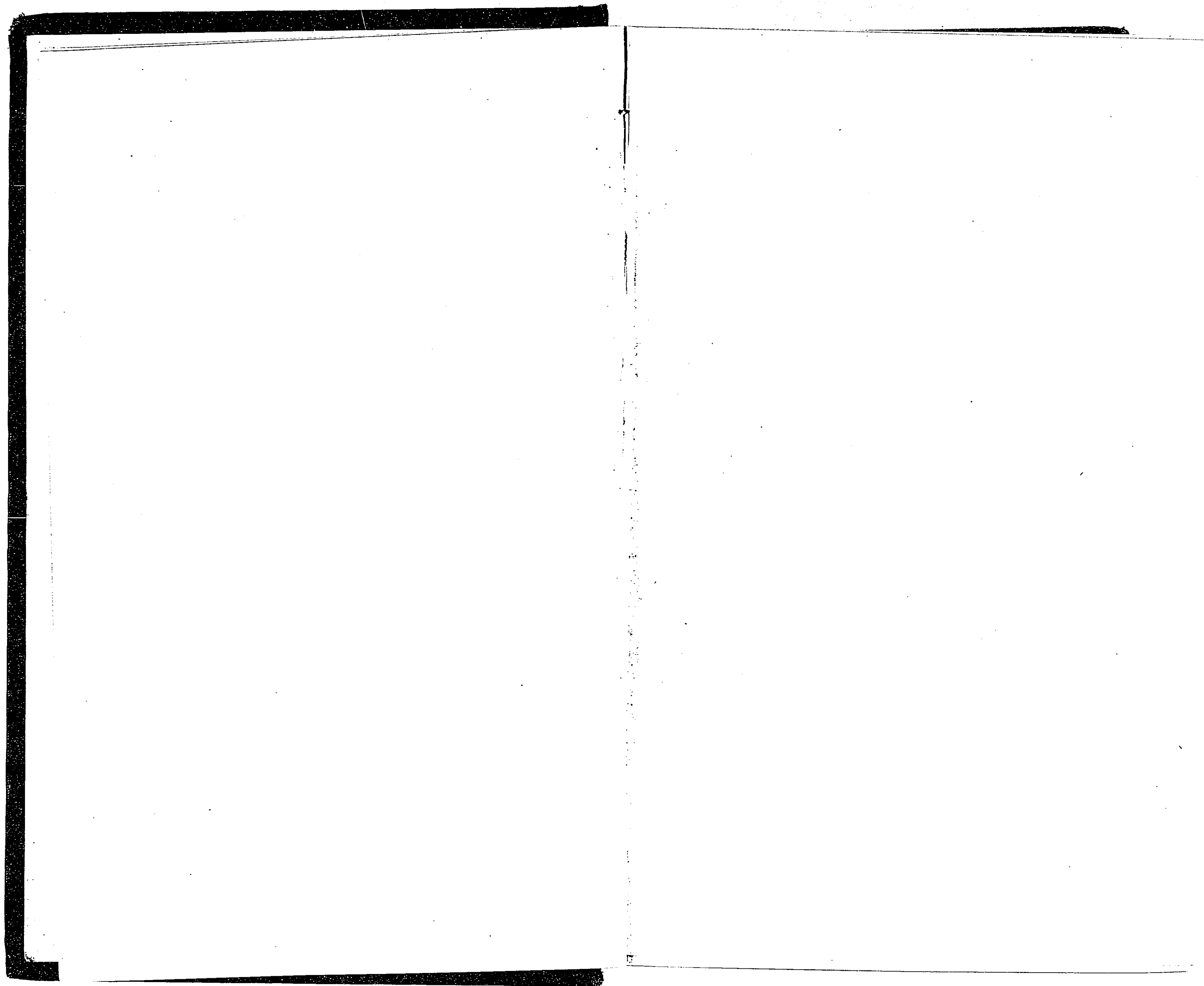
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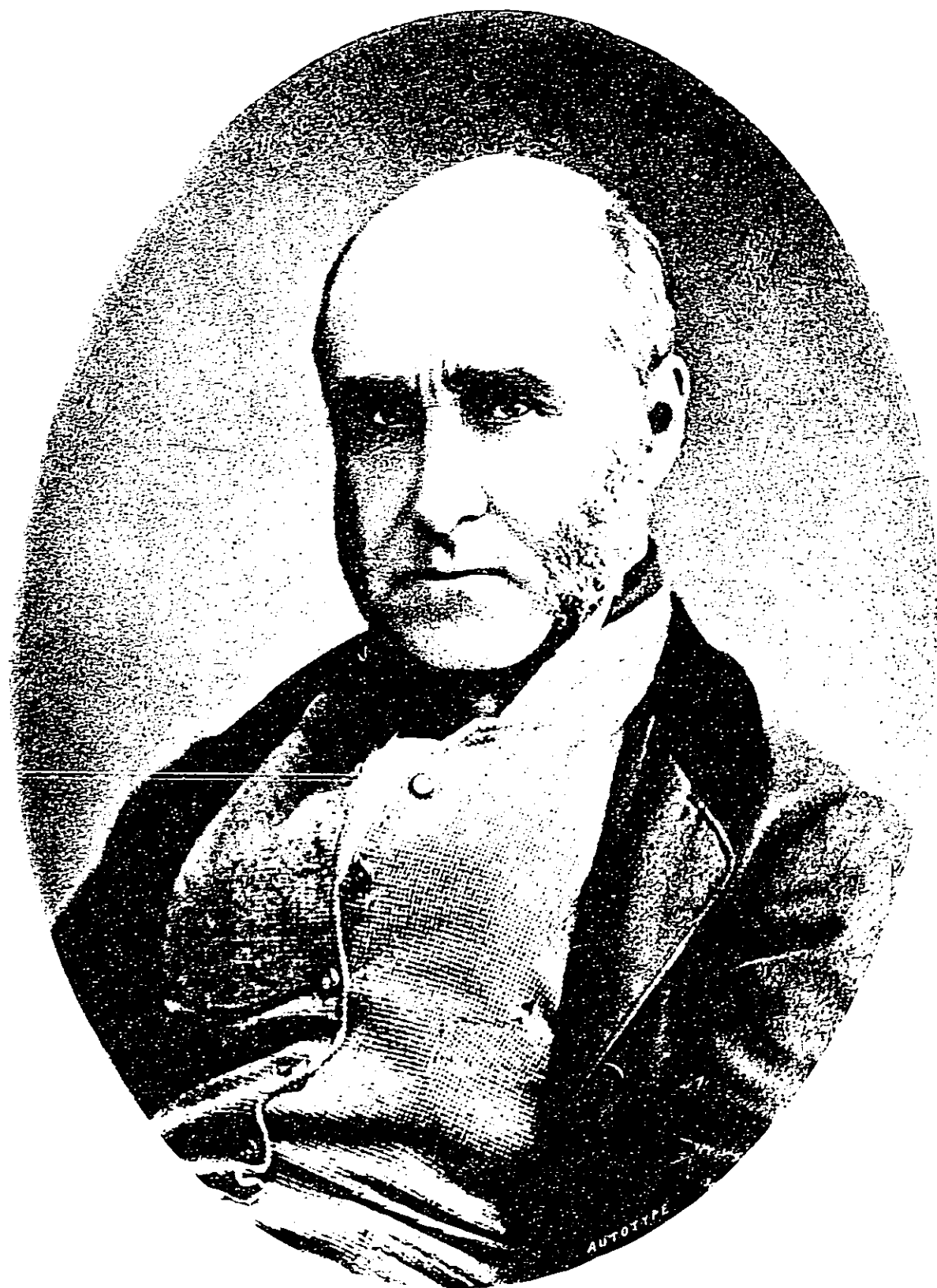
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1887.





JOHN SIMON, C.B., F.R.S.

*(From a Portrait taken in 1876.)*

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# PUBLIC HEALTH REPORTS.

By

JOHN SIMON, C.B., F.R.S., &c.

EDITED FOR

THE SANITARY INSTITUTE OF GREAT BRITAIN

BY

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VOL. II.

EXTRACTS FROM PRIVY COUNCIL REPORTS, 1858-1872.

LOCAL GOVERNMENT BOARD REPORTS, 1874-1876.

PRIVY COUNCIL REPORTS, 1874-1877.

ARTICLE ON CONTAGION FROM QUAIN'S DICTIONARY OF MEDICINE.

EXPERIMENT AS A BASIS OF PREVENTIVE MEDICINE.

LONDON:

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EXTRACTS

FROM

PRIVY COUNCIL REPORTS.

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VOL. II.

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## EXTRACTS FROM PRIVY COUNCIL REPORTS.

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### **The First Report to the Privy Council, 1858.**

[Extracts from this report (which related only to the last four months of 1858) have already appeared in the section, Vol. I., pp. 321-8, devoted to a description of the system of Public Vaccination in England. An account is also given in this first report of three important local inquiries in relation to matters concerning the public health in Conway, Wraysbury, and Windsor. The inquiry at Windsor was conducted by Mr. Austin, and it arose out of a complaint made by Sir James Clark, Physician to the Queen, that typhoid fever was prevailing epidemically there. A section of the report referred briefly to the then state of the public health in England.—Ed.]

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### **From the Second Report to the Privy Council, 1859.**

[Extracts from this report relating to Vaccination have appeared in Vol. I., pp. 328-44. This report also contains accounts of several important and interesting local inquiries, viz.: at Bridport, by the late Dr. Seaton, on account of small-pox; at Poulton-le-Sands, in Lancashire, by Dr. Burdon-Sanderson; and Kirkby Stephen, in Westmoreland, by Dr. Ord, both inquiries being on account of fever. An account is also given of proceedings in reference to the town of Sheerness, and of the inquiry held into the conditions of local government, together with the result of Mr. Austin's inquiry into the cause of the ague in Sheppey. Another part of the section of the report embracing local inquiries describes the proceedings taken in reference to the London Sewage Nuisance, Dr. Ord's report thereon forming part of the text. Two important sections of this report are given below. One of these appears under the general heading of "Distribution of Disease in England," &c., and it relates to Diarrhoeal Districts. The other relates to Epidemics of Diphtheria.—Ed.]

DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED.

*Diarrhoeal Districts.*

Diarrhoeal  
Districts.

In a Report\* submitted to the late General Board of Health on the eve of its dissolution, attention was drawn to the extreme inequality with which certain fatal diseases prevail in different parts of England. And it was pointed out that the diseases thus unequally prevailing are the diseases which most of all can be prevented. It was urged, as an almost inevitable conclusion from these facts, "that in certain districts of England, sometimes by good fortune, sometimes by good local government, definite causes of disease must have been kept at or near their least conceivable activity; while in other districts of England the same causes must have been prevailing with as little check, as if the community had been one of savages, to whom science had never taught her first and simplest lessons." It was submitted that all such cases of high special death-rate, as had in the report been referred to, "ought to be thoroughly investigated; that the local public, and the general public, and the Government, and the Legislature, ought to have before them the precise facts of each case where a preventable, or partly preventable, disease prevails to great excess in any particular district." And, with reference to the means for attaining this end, it was observed—"The Public Health Bill, now before Parliament, will, if it become law, provide for this object. Her Majesty's Privy Council, empowered to 'cause to be made such inquiries as they see fit in relation to any matters concerning the public health in any place or places,' will be able to bring before local authorities, and the people under their jurisdiction, facts in which the latter are so greatly interested. The appointed officer will be able to state, not only in such general terms as have here been employed, but in terms distinctly applicable to each case investigated,

\* The above reprinted "Papers relating to the Sanitary State of the People of England."—J.S.

" what local evils have to be removed in order to abate in various districts the present tenfold or hundredfold multiplication of some preventable disease." Diarrhoea  
Districts.

DIARRHOEA in its various forms was particularly referred to in the report. And it will be convenient for the present purpose to note the terms in which that reference was made.—[See above, Vol. I., pp. 436-442, from which here only a few sentences need be repeated.—ED.] "*Cholera, diarrhoea, and dysentery* have, during the nine years 1848-56, been fatal to 237,498 persons. If this number of deaths had been equally divided, the annual number would have been 26,388; but the distribution has been unequal. In the two years 1849 and 1854 there were 116,246 deaths; in the two years 1850 and 1855 there were but 29,425, or little more than a fourth part of the former amount. This inequality depends on the present tendency of diarrhoeal diseases to prevail in certain years epidemically. A large proportion of the excess of deaths in 1849 and 1854 occurred during a few summer weeks, when the epidemic influence was at its height, and when it occasioned in various parts of the country a very alarming mortality.... Dr. Greenhow's paper shows that these diseases have prevailed in different parts of the country with an astounding inequality. The average annual death-rate by cholera has ranged, from nothing and nearly nothing in some districts, to 357 and 365 and 403 in others.... But cholera has not been alone in showing this great range. Local differences of death-rate scarcely less wide have been shown by those diarrhoeal diseases which are always present among the population. Ordinary diarrhoea and dysentery have ranged in their joint average annual death-rate from under 10 in several districts, to 303 and 305 and 345 in others. Or if all diarrhoeal diseases, epidemic and non-epidemic, be taken together (as Dr. Greenhow has taken them) under the single heading of *alvine flux* the average annual death-rate by this class of disease has ranged in different districts, from 4, 8, 10, 14, and 17 in some, to 463, 493, 510, 568, and 663 in others.... If the diarrhoeal death-rate of England generally were even *only ten times* the minimum

Diarrhoeal  
Districts.

" diarrhoeal death-rate, there would be an annual saving in England of nearly 20,000 lives.\* .... A certain quantity of diarrhoea depends, no doubt, on other causes than putrefactive pollution of the system. *Phthisis* not rarely proves fatal by its effects on the intestinal canal; and probably a few of these deaths are registered under the name of the secondary disease. *Temporary faults of diet* very often occasion diarrhoea, though not often fatal diarrhoea. *Habitually improper food* (especially as regards infants and very young children) and various other influences contribute to the total of diarrhoeal deaths. But these various causes [so far as they are of personal origin] operate evenly, or almost evenly, throughout the country." And where any of them becomes of local importance,—as, where, for instance, in certain manufacturing towns, the constant engagement of mothers away from home in various branches of industry occasions on a great scale the improper feeding of infants and a consequent excess of fatal infantile diarrhoea, this influence, like that of the filthinesses first spoken of, is (the report went on to argue) of an unnatural and removable kind, of a kind against which local arrangements ought directly or indirectly to provide.

On all these grounds it seemed urgent that scientific inquiry should be made into the causes of the disproportionate localisation of diarrhoea in particular districts of England. And if the Privy Council, with respect to initiative action in matters of this kind, had to take for its principle, that it would without solicitation institute local inquiries in cases of excessive preventable mortality, the case of EXCESSIVE DIARRHOEAL MORTALITY seemed particularly fit for a beginning;

\* A less arbitrary and yet a stricter standard of comparison was furnished by Dr. Greenhow, in a paper published by the Statistical Society in their Journal of June 1859. In two considerable groups of contiguous registration-districts—one in the north with an aggregate population of 56,637, the other in the south with an aggregate population of 183,154, he found the average diarrhoeal death-rate to be only 29. If this partial rate were to become general in England (and the districts in which it prevails are by no means so faultless as to be unapproachable) there would occur annually in England about 3 diarrhoeal deaths where now there occur about 17; and the annual saving of life would be greater than is spoken of in the text.—J.S.

not only because its causes are for the most part grossly demonstrable; not only because of the popular terror which reigns during its epidemic prevalence as cholera; but at least equally because the endemic causes of diarrhoea are the causes of much other disease. If the diarrhoeal death-rate of England is reduced to that which prevails among the healthier part of the population, typhoid fever (now probably the cause of at least 15,000 annual deaths) will be reduced in more than equal measure. And in proportion as infantile diarrhoea is reduced, the convulsive disorders and respiratory inflammations of infancy (which now cause fully 60,000 annual deaths) will also show a very large, if not equal, reduction of death-rate.

Accordingly, with the above facts and arguments submitted, the Privy Council, so soon as authorized by the Legislature,\* determined to have inquiry made into the circumstances of those populations among which the diarrhoeal death-rate had been highest. And, possessed of information which the annexed table embodies with respect to the registration-districts of Coventry, Birmingham, Wolverhampton, Dudley, Merthyr Tydfil, Nottingham, Leeds, Manchester, Chorlton, and Salford, selected these places for first inquiry. Dr. Greenhow, hereupon engaged as a temporary Inspector under the Act, was instructed to visit them in succession. And his instructions were to investigate in each place,—first, what was the local distribution of diarrhoeal disease; and secondly (so far as was likely to relate to the causation of this disease) what, both generally and with distinction of localities, were the sanitary circumstances of the population.

The results of this inquiry are given in the reports [A]; copies of which are now being sent by the Privy Council to the several local authorities respectively interested in their contents.

Of these it is not practicable to give any short analysis; except, perhaps, by saying, almost in a word, that from first

\* The Act of Parliament which continued the functions of the Privy Council in reference to matters of public health became law on August 1st, 1859, and the necessary instructions for this inquiry were thereupon immediately issued.—J.S.

Diarrhoeal  
Districts.

Diarrhœal  
Districts.

to last they consistently illustrate the preventability of diarrhœal death.

One illustration of this fact, belonging to almost all the districts, may be quoted with satisfaction. Generally in them, it seems, there has been for several past years a growing, though still insufficient, perception of the importance of cleanliness:—in all, it seems, something, though far from enough, has been done for sanitary improvement; in some cases, structural deficiencies have been partly supplied; and probably in all cases greater attention has been given to scavenging and other such removal of filth. Except in one town (where well-intended, but ill-devised, endeavours to increase the privy accommodation of the poorer classes have unfortunately been productive of mischief) the local prevalence of diarrhœa has in consequence been reduced. The annexed table compendiously shows the particulars of this reduction.

On the other hand, it must not be concealed that, though a beginning has been made, a vast deal remains to be accomplished. Even those improved death-rates, which are shown in the 1854–58 column of the table, are very greatly in aggravation of what is due.

There are *districts of England in which endemic diarrhœa is unknown*. There are *extensive groups of districts* where (as the last line of the table shows) the *habitual death-rate from diarrhœa does not attain 30*; and even in these districts the existing diarrhœa is assuredly much beyond what it would be if cleanliness were in all cases duly cared for. It is therefore nothing unreasonable, to take their death-rate as a standard for comparison. Tested by this standard, the districts now reported on show, even in their ameliorated state, an extravagant mortality from diarrhœa,—a mortality which is from  $3\frac{1}{2}$  to 9 times as high as that of the districts here contrasted with them. It is, therefore, greatly to be hoped, that, by the information now collected and communicated, the respective local authorities in these several districts will be induced to apply with increased vigilance the means which are necessary for removing from their administration the reproach of preventable, but unprevented, disease. And in this

Diarrhœal  
Districts.

YEARLY NUMBER OF DIARRHŒAL DEATHS (Diarrhœa, Dysentery, and Cholera) in the several under-mentioned Registration Districts.

REGISTRATION DISTRICTS.											
—	Coventry.	Birmingham.	Wolverhampton.	Dudley.	Merthyr Tydfil.	Nottingham.	Leeds.	Manchester.	Chorlton.	Salford.	
Population in 1851 -	36,812	173,951	104,158	106,530	76,804	58,419	101,348	228,433	123,841	87,523	
Year.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.	Diarrhœal Deaths.
1848	79	440	122	240	51	58	243	644	387	224	
1849	305	464	1,615	682	1,779	125	1,770	1,791	656	514	
1850	67	444	130	174	75	91	204	678	312	192	
1851	191	480	190	250	125	140	294	494	258	191	
1852	163	511	272	262	124	128	386	937	416	368	
1853	121	394	196	214	117	129	270	543	236	243	
1854	180	610	372	614	581	179	331	728	348	352	
1855	60	308	133	187	93	66	148	449	200	189	
1856	77	358	199	208	65	92	184	492	252	203	
1857	158	609	285	348	114	221	258	695	321	269	
1858*	61	352	151	208	78	169	251	473	162	226	

\* The numbers for this year were only obtained during the inquiry.



Diarrhœal  
Districts.

## AVERAGE ANNUAL PROPORTION OF DIARRHŒAL DEATHS PER 100,000 OF LIVING POPULATION.

Population in 1851.	Registration Districts.	DIARRHŒAL DEATHS		Exclusion of Deaths as below, which were ascribed to Epidemic Cholera.
		During the Years 1848-1854.	During the Years 1851-1856.	
36,812	Coventry - -	350	266	202 cholera deaths in 1849 excluded.
173,951	Birmingham - -	274	233	{ The few cholera deaths which have occurred (only 99 in the 11 years) are <i>not</i> excluded from the calculation.
104,158	Wolverhampton - -	210	193	1,346 cholera deaths in 1849 excluded.
106,530	Dudley - -	237	221	412 cholera deaths in 1849, and 256 in 1854, excluded.
76,804	Merthyr Tydfil - -	135	106	1,683 cholera deaths in 1849, and 455 in 1854, excluded.
58,419	Nottingham - -	208	234	{ The few cholera deaths which have occurred are <i>not</i> excluded from the calculation.
101,343	Leeds - -	291	217	1,436 cholera deaths in 1849 excluded.
228,433	Manchester - -	320	228	891 cholera deaths in 1849 excluded.
123,841	Chorlton - -	270	165	279 cholera deaths in 1849 excluded.
87,523	Salford - -	303	255	234 cholera deaths in 1849 excluded.
239,791	Standard Districts of England during the years } 29 1847-1855			

respect, one paragraph from the following paper,—a paragraph Diarrhœal  
which expresses the most definite result of Dr. Greenhow's Districts.  
observations in all the diarrhœal districts, and which accords  
with all the best experience previously obtained in other like  
investigations, deserves to be well remembered:—

“The excess of mortality has in all the places been coincident  
with one or other of two definite local circumstances;

(a) the tainting of the atmosphere with the products  
of organic decomposition, especially of human excre-  
ment,—or

(b) the habitual drinking of impure water.”

It also deserves to be remembered, both by the local autho-  
rities of these districts, and even more by the great manu-  
facturers whose unparalleled wealth is acquired in them, that  
the extensive factory-employment of female labour is, unless  
care be taken to avert its effects, a sure source of very large  
infantile mortality, both diarrhœal and convulsive; that where  
mothers are engaged in factories, infants who should be at the  
breast are commonly ill-fed or starved, and have their cries  
of hunger and distress quieted by those various fatal opiates  
which are in such request at the centres of our manufacturing  
industry; and that the labouring classes themselves have not  
the power of organizing such arrangements as might at least  
greatly mitigate this evil.

PROCEEDINGS IN REFERENCE TO THE PREVALENT EPIDEMICS  
OF DIPHTHERIA.

During the last four or five years there have been pre- Diphtheria.  
vailing in various parts of England alarming epidemics  
of DIPHTHERIA,—a disease which, as epidemic, was previously  
almost unknown to the present generation of medical  
practitioners. Not quite unknown, indeed; for, although the  
last great prevalence of the disease in Britain was during the  
two middle quarters of last century, there had been since  
that period, and within living recollection, a few little local  
epidemics, as well as some isolated cases. But, from the

Diphtheria.

summer of 1855 to the present time, diphtheria has again been continuously prevalent in England; invading different places in succession; sometimes remaining fixed (even for three and four years) where once its footing has been gained; sometimes holding less tenaciously to the place, and leaving it after only some few weeks' tenure; but unfortunately also sometimes returning to it again and again.

These facts have been made known to the Privy Council; and, in consequence, during the past year, extensive inquiries have been made, under orders of the Privy Council, with a view to collect for common use the various particulars of experience which different localities could supply. Much correspondence has taken place with this object; and the principal seats of the epidemic (to the number of 70, situate in 17 different counties of England) have, during the year, been personally visited for the purposes of more minute inquiry. The valuable information thus collected is given in the following papers [A].

Had time allowed, it might have been desirable to bring the mass of material into a somewhat different arrangement. But even the present primary compilation has but quite recently been completed; and though the utmost despatch has been used, it has been found barely possible to include the information, as it now stands, in the present Annual Report. On the whole, however, it has seemed far better to take this course, than to let a year elapse before the publication of matter which may be of much professional use. All the more, too, this course has seemed eligible, because the present papers represent only in part the facts of a visitation which unfortunately is still in progress. And before the history of the present epidemic can be adequately written, much other information has to be collected.

To illustrate the great difficulties which in this country attend any attempt to investigate scientifically the facts of epidemic disease, it deserves consideration that no periodical returns are here made with respect to disease treated at the public expense; nor is any local authority bound (however needfully for the public good) to give information to the Government as to the outbreaking of any unusual epidemic.

Diphtheria had been prevalent in parts of England for two years before there was any public knowledge of the fact;\* and under these circumstances, it has been scarcely possible to procure any trustworthy record of the first beginnings of the disease. Even as regards a less exact kind of observation, the Registrar-General has not had it in his power to supply, for the use of the Privy Council, such an account of the deaths from throat-diseases during successive quarters of the last few years as might have enabled the course of the epidemic and the distribution of its mortality in different

\* Diphtheria began to be prevalent in Cornwall in the autumn of 1855. It was not till November 1857 that the then existing General Board of Health had such information as justified its issuing any public notification on the subject. In the number of the *Weekly Return of Diseases in the Metropolis* (printed by the Board) with reference to the week ending Saturday, October 31st, 1857, there was contained the following passage:—"In future numbers of the *Weekly Return* a separate column will be allotted to new cases of *Diphthérie*;—a peculiar, very dangerous, febrile disease, attended with destructive inflammation in the mucous membrane of the throat, and specially marked by the formation there of an *adhesive or croupy false membrane* which conceals the inflamed surface, and belongs (not, as in true croup, to the respiratory passages, but) especially to the pharynx and fauces. *Diphthérie* is a word which, according to its etymology (*διφθέρα*, a hide or membrane) has been applied to many diseases in which the presence of a croupy exudation is a remarkable feature; but in England it is commonly received in the limited sense of diphtheritic (*i.e.* false-membrane-forming) inflammation of the pharynx. This disease has no popular English name; for, though it has been well known and well described in France, it has hitherto in England been comparatively unknown as an idiopathic complaint. At the present time *diphthérie* threatens to demand more attention in this country; for apparently it is to its prevalence, as a cause of death in several districts, that various registrars' notes in the late quarterly report of the Registrar-General refer. In these notes, 'inflammation of the throat,' 'putrid sore throat,' 'malignant sore throat,' 'disease in the throat,' and 'throat fever,' are the expressions used to designate a complaint which has proved fatal in the registration districts of Thame, Billericay, Maldon, Liskeard, Truro, and Chesterfield; and other information makes it probable that an unusual disease of the throat is prevailing more or less epidemically in some other parts of the country. There is reason to believe that cases are also occurring within the limits of the metropolis; sometimes recognized in their true nature, and called either *diphthérie* or Boulogne fever; sometimes, perhaps, mistaken for true croup, or for the throat-inflammation of scarlet fever, or for some other disease. Cases of this unfamiliar complaint will be interesting to the officers of health; who, with a view to the prevention of the disease, will of course be anxious to collect information both as to its predisposing and exciting causes, and as to the symptoms which betoken its commencement. It is therefore important that the many names under which it may appear in the registers of sickness and mortality should be borne in mind."—J.S.



Diphtheria.

districts to be at least approximately mapped out. And the information now submitted, as the fruit of inquiries made by the Privy Council, relates (as already stated) to only parts of the visitation.

## APPENDIX.

Heads for Local Inquiry in Diphtheria Districts.

HEADS FOR LOCAL INQUIRY IN DISTRICTS WHERE DIPHTHERIA HAS BEEN EPIDEMIC.

1. *As regards the general features of the District.*

- a. What is the character of the district as to level, exposure, soil, drainage, and (if rural) cultivation, or (if urban) density of building?
- b. What is the source, and what the general character of the water-supply of the district?
- c. Is the district liable to ague, to autumnal fever or diarrhoea, to bronchocele, or to any other endemic disease?

2. *As regards the duration, extent, and novelty of the Epidemic in the District.*

- a. When was the first, and when the last, case of Diphtheria in the district?
- b. What was the number of attacks of Diphtheria, what the number of deaths occasioned by it, and what the number of houses among which the attacks were distributed?

§ Append any lists which individual practitioners will furnish, according to the accompanying form, of the cases which they respectively have attended.

- c. Is there any local recollection of Diphtheria having prevailed before in the district or neighbourhood? if so, when? and to what extent?

3. *As regards contemporaneous or recent diseases in the District.*

- a. Did other varieties of sore-throat (*i.e.* varieties not attended by the formation of false membrane) prevail in the district at about the same time as Diphtheria? If so, did they precede, or accompany, or follow, its prevalence? And did they in any cases prove fatal, or present unusual features?
- b. Did scarlatina prevail in the district at about the same time as Diphtheria? If so, did it precede, accompany, or follow? And did it present unusual features?
- c. Did erysipelas or puerperal fever?
- d. Did common continued fever?

Heads for Local Inquiry in Diphtheria Districts.

- e. Did any other disease, either of the human subject or of the lower animals, prevail in the district to an unusual extent, or with unusual features, either during, or shortly before, or shortly after, the prevalence of Diphtheria?

4. *As regards local and personal conditions predisposing to Diphtheria.*

- a. In what number, and with what severity, did cases occur in dry and airy parts of the district, as compared with low-lying, damp, and confined parts?
- b. In what number, and with what severity, did cases occur in thoroughly well-constructed and well-kept houses or rooms, as compared with houses or rooms in which the atmosphere was offensive from defects of drainage, or from over-crowding and non-ventilation, or from other kinds of uncleanness?
- c. Had the houses in which Diphtheria was prevalent been previously much subject to any [and, if any, what?] other kinds of disease?
- d. In what number, and with what severity, did cases occur among persons enjoying affluent or comfortable circumstances of life, as compared with persons suffering privation?
- e. What has been observed as to the influence of age, occupation, habit of body, and personal antecedents, in increasing or diminishing the liability to contract Diphtheria, or to suffer any of its symptoms in a severe form?

Was any difference in this respect observed between persons who had, and persons who had not, previously had scarlatina?

5. *As regards the communicability of Diphtheria.*

- a. Did it often happen [and, if so, give instances] that cases of Diphtheria occurred singly in households where there were children in free communication with the patient?
- b. Did it often happen [and if so, give instances] that all or nearly all the inmates, or all or nearly all the children, of considerable households were eventually attacked with Diphtheria, in houses where one case had arisen? or that they were attacked with any other kind of sore throat?
- c. Where two or more cases occurred in succession in one house, what commonly was the interval between them?
- d. To what extent is it the case (either as regards the district generally, or as regards particular houses and establishments in the district) that the persons first attacked with Diphtheria had previously been in communication with houses wherein that disease was prevailing?

Heads for Local  
Inquiry in Diph-  
theria Districts.

or with houses in which some other kind of sore-throat was prevailing? or with houses in which scarlatina was prevailing, or with houses in which erysipelas, or any other kind of febrile or inflammatory disease was prevailing?

If in any case diphtheria seems to have resulted from such communication, what was the nature of the communication? And what time elapsed after the communication before the new case of diphtheria commenced?

Did it ever appear that diphtheria was propagated by accidental inoculation or contact with the morbid secretion of the throat?

If, among persons equally communicating with the sick, some were attacked with diphtheria, while others remained free from it, to what was this difference attributed?

6. *As regards the symptoms of Diphtheria.*

Did Diphtheria, as observed in the district, differ in any [and, if any, what?] important respect from the account given of it, generally, in the following paragraphs; viz. :—

a. that the essential local sign of the disease, seen on inspecting the throat of a patient in the early stages of Diphtheria, is the presence of a fibrinous exudation, more or less firmly coagulated upon the inflamed surface of the fauces, tonsils and pharynx; where, blended with the epithelium of the part, widening as the inflammation extends, and becoming thicker by successive additions to its deep surface, it appears as a continuous raised layer of white or whitish membrane (*diphthera*) and tends after some days to be thrown off, like a slough, in a partially decomposed state?

b. that the diphtheric inflammation is never primarily attended by any ulceration or sloughing of the mucous membrane, though in some cases these processes occur at later stages of the disease: but that always at first there lies beneath the false-membrane a merely excoriated surface; on which, while in this state, there may coagulate, before healthy epithelium is restored, successive new layers of fibrinous matter more or less mixed with the corpuscular products of inflammation?

c. that the diphtheric inflammation, besides generally extending to the mucous membrane of the nose (where also, though rarely, it may begin, and where in either case its presence may occasion epistaxis) sometimes descends along the mucous membrane of the air-passages; superadding, in such cases, the ordinary symptoms and dangers of croup to those of the original affection?

d. that usually the lymphatic glands below the jaw, and sometimes the cellular membrane of the neck, are more or less irritated and swollen during the inflammation of the throat?

Heads for Local  
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theria Districts.

e. that the disease is not, except sometimes at its beginning, attended by febrile excitement; but is commonly, throughout its course, marked by signs (often by alarming signs) of depression?

f. that more or less irritation of the kidneys is of very frequent, if not universal, occurrence at some period or other of the disease; involving, while it lasts, an albuminous state of the urine, and the presence in it of microscopical casts of the urinary tubules?

g. that the disease may be complicated with other internal inflammations—especially with pneumonia; and that intestinal hæmorrhage may occur during its course?

h. that patients often remain in a state of anæmia and weakness, even of dangerous weakness, long after the throat-affection has ceased; and that some of them, during this condition, suffer functional nervous disorder—such as impairment of vision, partial loss of sensation, or paralytic or convulsive affection of voluntary muscles?

§ Append any notes which individual practitioners will furnish, of carefully observed cases of diphtheria, wherein either its less frequent symptoms or complications have occurred, or its common symptoms have been minutely investigated; e.g.,

of cases, if any, where cutaneous eruption has appeared—the exact character of which should be specified, as also the period of the disease during which it was visible, and the issue of the cases in which it was observed; of cases, if any, in which the skin has desquamated;

of cases in which the throat-affection has been accompanied or followed by serious inflammation of internal organs, or by any kind of hæmorrhage; of cases, if any, in which dropsy has ensued;

of cases in which peculiar nervous sequelæ have been well marked;

of cases, if any, in which a blistered or otherwise excoriated surface of the patient's skin, or the mucous membrane of the pudenda, has taken on anything like diphtheritic inflammation;

of cases in which the urine has been specially examined day by day during the disease;

of cases in which the temperature of the body has been noted;

also of any carefully made post-mortem examination, especially such as may illustrate the internal complications of the disease;

also of any precise observations which may show the value of particular symptoms as guides to favourable or unfavourable prognosis.

Heads for Local  
Inquiry in Diph-  
theria Districts.

7. *As regards the treatment of Diphtheria.*

- a. Has any treatment been found more effectual than the use of ordinary escharotics (e.g. nitrate of silver or hydrochloric acid) to arrest the formation of false membrane in the throat? If any cases were treated without escharotic or stimulant applications, what was the result?
- b. Has any treatment been found more effectual than the use of alcoholic stimulants to counteract the depression which belongs to severe cases of the disease?
- c. If tracheotomy has in any cases been performed for the relief of laryngeal obstruction arising in the disease, what has been the number and what the result of such cases? Has any treatment been, under the circumstances, more successful than tracheotomy?
- d. What treatment has been adopted, and what result has ensued, in cases of internal inflammation complicating the disease.
- e. Has any treatment been found more effectual than the use of ordinary tonics to remove the sequelæ of the disease, especially those that affect the nervous system?
- f. What knowledge has been obtained as to the fact of any particular drug exerting a specific influence against the disease?

*Privy Council Office, London, S.W., 1859.*

**From the Third Report to the Privy Council, 1860.**

[The Third Report comprises sections relating to Vaccination and the Distribution of Disease in England. The former has appeared in Vol. I., pp.345-52, and the latter is subjoined. It relates to industrial occupations which cause Lung Disease.—ED.]

DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED—*cont.*

*Lung-Diseases.*

IN the last report which I made to the late General Board of Health,—a report which, as regards its subject-matter, was introductory to the annual reports which I have now the honour of submitting to the Privy Council,—I drew attention to the fact, strikingly displayed in some statistics which Dr. Greenhow had then recently compiled, that *certain dis-*

High local  
death-rates  
from par-  
ticular kinds  
of disease.

*cases, which, among them, make up fully half of our annual mortality, are fatal in widely different degrees in different districts of England.\**

High local  
death-rates  
from par-  
ticular kinds  
of diseases.

For instance :—while DIARRHŒAL DISEASES had been causing in England annually more than 26,000 deaths, the rate† of mortality from these diseases had ranged from 4, 8, 10, 14 and 17 in some districts, to 463, 493, 513, 568 and 663 in others. So again, while FEVER had been killing annually more than 17,000 persons, the death-rate by fever in different districts had ranged from under 50 (already a grievous excess) to more than 200. Similarly with regard to those diseases which are the most common CAUSES OF INFANTINE MORTALITY—diseases which had annually been killing more than 100,000 young children, death-rates had ranged from about 1,300 to about 9,000. Other death-rates, which are among the most important in the register, the death-rates of the adult population by PULMONARY DISEASES had ranged, as regards grown-up men, from 221 and 306 to 1,298 and 1,440. Death-rates by PHTHISIS alone among grown-up women had ranged from 229 to 558.

On the ceasing of the General Board of Health, the above very suggestive facts came under cognisance of the Privy Council. The inference was inevitable, that, to account for so unequal a distribution of particular kinds of death, there must prevail almost corresponding inequalities in the distribution of causes of disease. And their Lordships, authorised by the Legislature “to cause to be made such inquiries as they “see fit in relation to any matters concerning the public “health in any place or places,” concluded that this apparent localisation of particular morbid influences was quite especially a fit matter for inquiry.

Accordingly, during 1859, inspections were made in what, for brevity, may be termed the DIARRHŒAL DISTRICTS of England. And my last year’s report contained a statement of the results which that proceeding elicited.

\* “Papers relating to the Sanitary State of the People of England.”—J.S.

† The rates are all proportionate to a hypothetical local population of 100,000 living.—J.S.

Lung-diseases.

During 1860 similar inspections have been made with regard to another great class of fatal diseases. The problem of the year has had reference to DISEASES OF THE LUNG:—Why is it, that, in some districts of England, grown-up men or women die from these diseases, or from some of them, three times, four times, even six times, as abundantly as in other districts?

Our large adult mortality from lung-disease is of course very compound in its kind; but two special diseases, between them, make up most of its amount. *Tubercular phthisis* is one of these chief factors; *bronchitis* with its effects is the other. And, with respect to both of these affections, it seemed certain that their great development in particular districts has essentially to do with the industrial relations of the people.

In analysing the statistics of lung-disease, a first great contrast was found to lie between populations, respectively agricultural and manufacturing:—*in proportion as the male and female populations are severally attracted to in-door branches of industry, in such proportion, other things being equal, their respective death-rates by lung-disease increased.* And there are medical reasons, which need not now be detailed, for assuming the augmented “lung-disease” to be PHTHISIS. What is the meaning of this fact?

In the medical mind it at once associates itself with a very important result, which was well developed seventeen years ago by the late Dr. Baly, in his admirable essay on the *Diseases of Prisons*. From examination of the medical records of the Millbank Penitentiary, Dr. Baly had learnt “that the mortality caused by tubercular disease had been between three “ and four times as great during the 18 years, 1825–42, among “ the convicts confined in this prison, as it was in the year “ 1842 among persons of the same period of life in London “ generally; and that three-fourths of the excess of deaths “ from all causes in the penitentiary above the rate of mor- “ tality of all persons in the metropolis of the same period of “ life had been due to the prevalence of that disease.” Comparing the large number of prisoners in whom tubercular disease of the lungs first showed itself while they were in the

penitentiary with the small number who were affected with Lung-diseases. it at the time of their reception, he was convinced “that “ imprisonment exerted here a very powerful influence in “ causing the development of the disease.” Extending his inquiry to the other prisons of England, and to the persons of other States in Europe and America, he found that the influence was one of universal operation, and learnt (as might have been expected) that other forms of scrofula were developed in the same proportion as pulmonary phthisis; that not merely this one form of the infliction, but tubercular disease in all its forms, resulted from the long-continued influence of imprisonment on the bodily health.\* This influence appears to be partly physical and partly moral:—among its component parts (with cold and poorness of diet) Dr. Baly enumerates *deficient ventilation, sedentary occupations, and want of active bodily exercise, and a listless or dejected state of mind.* Of the points thus enumerated, there are some in which the life of textile factory-populations, and of certain other in-door work-people, is comparable to the life of prisoners. Taking, for instance, the case of girls and women who from childhood onwards sit ten hours a day or more, often in constrained postures, weaving or knitting at looms and stocking-frames, or plaiting straw, or stitching gloves, or lace-making:—this life, at its best, has to a great extent the evils of monotony, of deficient bodily exercise, of physical seclusion from sun and air, and of mental privation from what is beautiful and animating in external nature. And thus probably, even at its best, it tends to produce somewhat of vital depression, somewhat of mental and bodily etiolation, during which, especially with persons otherwise predisposed to scrofula, there is a heightened liability to tubercular disease. Where an industrial system is bad,—bad, either in excessive length of daily work, or in the over-crowdedness and non-ventilation of work-places, these evils may be vastly developed. Their

\* During the years which have elapsed since the publication of Dr. Baly's paper, progress has been made toward removing from prison-life many known causes of scrofulous disease. And as the fever-mortality of Howard's time long ago followed the removal of its causes, so, no doubt, the high tubercular mortality of prisons is at present in course of extinction.—J.S.



Lung-diseases. maximum may be expected to prevail in places where an over-tasked population does its work in ill-ventilated factories and cottages.

From these considerations, it would of course not necessarily follow that an excess of phthisis, prevailing in our great centres of manufacture, is, in any practical sense, preventable. But at least there was great encouragement to inquiry. Should it appear that a high development of phthisis among men and women employed in certain manufactures is really an essential appanage of the employment, even when not excessively laboured in, then perhaps might be borne, without fruitless repining, this tax on the industry of our people. But should it, on the contrary, appear that the production of disease in each phthisis-breeding employment depends in great part on sanitary faults which might be eliminated from the employment—on defective ventilation, for instance, and other like influences, then at once the way would be opened to an improved economy of life in many chief branches of popular industry. [See footnote at page 455, Vol. I.] Accordingly, as regards phthisis, these considerations were submitted to their Lordships.

Our statistics of lung-disease had justified a second generalisation. Conspicuous among the suffering districts, stood places which are the chief seats of metal-mining,\* of metal-manufacture, and of pottery-manufacture. And there were medical reasons for presuming that in these places the predominant lung-disease was, at least primarily, BRONCHITIS. For, with reference to this disease, two kinds of occupation have long been recognised as peculiarly hurtful;—first, those which give rise to *mechanical or chemical irritation of the air-passages*, by diffusing in the air of work-places any considerable amount of metallic or earthy grit, or of acrid smoke or vapor, or even of dust or fluff from flax, cotton

\* Special reference was made to "the most exclusively lead-mining district in England" as one, which (though remote from city influences, and situated in the midst of a most salubrious country) had been losing by diseases of the lung, in consequence of its prevalent occupation, a "larger annual proportion of its adult male inhabitants than the unhealthiest city in the kingdom, and as the place in which there is a larger proportion of widows than in any other place in the kingdom."—J.S.

or wool; secondly, those in which the operatives are exposed to *abrupt changes of temperature*. And it was notorious that, in one or both of these respects, abundant causes of bronchitis might exist in the above-mentioned branches of industry, as also in some textile occupations. Indeed, except where special provision is made against them, such causes could not fail to affect considerable classes of operatives; these, for instance, whose breath is drawn amid the metallic spray of a cutler's grinding-wheel, or amid the blast-soot and rock-dust of metal-mining, or amid the products of flax-hackling and cotton-carding, or amid clouds of flinty powder in the pressing and scouring rooms of a pottery; or those, on the other hand, who work in such air as serves to evaporate potters' slip, or beside the stoves where earthenware is dried, or amid the hot-water troughs from which flax is spun, or in the heat of copper-mines, and who, during their work or in leaving it, run all chances of other temperature. To what extent provision is actually made against the dangers referred to, could not without inquiry be exactly stated. Nor could it in the first instance be judged to what extent such evils, where prevailing, could readily be reduced or removed. But meanwhile the case, as it stood, was submitted to their Lordships.

And commonly, with reference to both phthisis and bronchitis, this further conclusive proof was given as to the influence of an accused occupation; viz., that the high death-rate from lung-disease belonged specially, according to the occupation, to the men, or to the women, of the district; that it sometimes was nearly twice as high for the employed sex as for the unemployed sex; and that it only extended to both sexes, where both were engaged in the occupation.

Their Lordships, having considered the above facts in their relation to certain large branches of industry, and having been pleased to accept my opinion that, in order to render those facts applicable to particular cases, more circumstantial evidence must be collected, ordered that, for this purpose, inquiries by an inspector should be made at some of the principal seats of the accused occupations. The places selected for inquiry were the following;—

Lung-diseases.

STOKE - UPON - TRENT and WOLSTANTON, in both which places the population, male and female, is largely employed in the *making of earthenware and china* ;

BROMSGROVE, ALCESTER and SHEFFIELD, where the chief occupation, male and female, is *working in iron* ;

PENZANCE and REDRUTH, where *tin-mining* and *copper-mining* are the special pursuits of the men, and give also some employment to women ;

REETH, where half the adult men are employed in *lead-mining* ;

PATELEY BRIDGE, where there is also some lead-mining, but where specially there is work in *flax-factories* for both male and female population ;

MACCLESFIELD and LEEK, where the population, both male and female, is largely employed in *silk-working* ;

LEEDS, BRADFORD, STROUD, and MELKSHAM, where people of both sexes work specially in *wool-factories* ;

Population in 1851.	Registration Districts.	DEATH-RATES by Pulmonary Diseases, including Phthisis.	
		Males.	Females.
57,942	Stoke-upon-Trent	721	665
41,916	Wolstanton -	726	727
24,822	Bromsgrove -	583	559
17,482	Alcester -	559	577
103,626	Sheffield -	839	670
53,517	Penzance -	560	456
53,628	Redruth -	670	450
6,820	Reeth -	724	528
7,579	Pateley Bridge -	508	391
63,327	Macclesfield -	691	804
23,031	Leek -	588	705
101,343	Leeds -	817	718
181,964	Bradford -	611	603
37,386	Stroud -	511	511
18,815	Melksham -	626	559
60,642	Leicester -	740	659
15,595	Hinckley -	652	603
96,545	Preston -	776	768
12,806	Towcester -	475	573
23,109	Newport Pagnell -	490	545
12,527	Berkhampstead -	401	566
28,463	Yeovil -	528	591
20,716	Saffron Walden -	520	612
	As Standards for comparison :—		
56,637	Six Northern Districts -	297	304
71,330	Six Southern Districts -	411	454
183,154	Ten South-Western Districts -	446	395

N.B.—Each death-rate is proportionate to a hypothetical population of 100,000 males, or 100,000 females. The death-rates are calculated *without distinction of age*. Were they calculated for only the working ages of life, the contrasts would appear much more marked. The contrasts might also be far better shown, if it were possible to give the death-rates of *special operatives* exclusively, instead of giving the death-rates of whole districts. The death-rates are for the seven years 1848-54 except in regard of the standard districts, where, they are for the nine years 1849-54.

LEICESTER and HINCKLEY, where the *making of hosiery* Lung-diseases. occupies a large part of the population, both male and female.

PRESTON, where the principal employment of both sexes is in *cotton-factories* ;

TOWCESTER and NEWPORT PAGNELL, where the female population is largely engaged in *lace-making* ;

BERKHAMPSTEAD, where the female population is largely engaged in *straw-plaiting* ;

YEOVIL, where some of the male, and a large proportion of the female population are engaged in *glove-making* ;

SAFFRON WALDEN, where the industry is *agricultural*, and where the causes of pulmonary disease are not of an occupational kind.

And the statistical evidence which led to this selection of places is expressed in the adjoining table ; where at a glance may be seen the proportion of mortality from lung-disease in each inspected district as compared with certain suitable standards of health.

The local inquiry was entrusted to Dr. Greenhow, whose valuable statistical compilation, already referred to, had first demonstrated the full importance of the subject. And the instructions, which, under their Lordships' orders, I gave for the inquiry, were to this effect :—that Dr. Greenhow, visiting the enumerated districts (with a view to ascertain in each of them, as far as possible, what is the present pressure of pulmonary disease on the adult population, and what local circumstances contribute to cause any excess which may be discovered of such disease) should, in each district, particularly inquire of the registrar of deaths as to the degree in which the local death-rate by pulmonary disease is influenced by the deaths of persons engaged in such occupations as are more or less special to the district ; that he should also in each district seek to learn from the officers of friendly societies, of medical charities, and of the poor law service, in what amount and with what distribution pulmonary disease habitually exists among the adult local population ; that in any case where much pulmonary disease is found to be concurrent with the pursuit of any particular occupation, he should inquire into the details of the occupation, especially with regard to those influences

Lung-diseases. in it which seem likely to be hurtful to health, and should personally observe the actual state of health of operatives exposed to such influences.

#### From the Fourth Report to the Privy Council, 1861.

[The Fourth Report comprises sections relating to Vaccination and the Distribution of Disease in England. The former has appeared in Vol. I., pp. 353-6, and the latter is subjoined. It relates—(1) to industrial occupations which cause Lung Disease; (2) to the causes of excessive infant mortality in some manufacturing places.—Ed.]

#### DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED—*cont.*

Since 1858 there has been in progress, under their Lordships' orders, a systematic investigation of the circumstances under which particular districts in England suffer an excessive mortality from particular sorts of disease. The inquiries made under this head in 1861, and now requiring to be separately spoken of, were as follow:—

- (1) an inquiry continuing that of 1860, into the circumstances under which there is in certain districts a great ADULT MORTALITY FROM LUNG-DISEASES; and
- (2) an inquiry into the circumstances under which there is in some districts a great MORTALITY OF YOUNG CHILDREN.

#### 1. *Excessive Adult Mortality from Lung-diseases in certain Districts of England.*

Inquiry into  
Adult Mor-  
tality from  
Lung-diseases.

Inquiry as to locally prevailing causes of Lung-Disease was made, during 1861, at the following important centres of industry:—Birmingham, Aston, Nottingham with Radford and Basford, Wolverhampton, Merthyr Tydfil, Abergavenny, Coventry and Blackburn.

During 1860, inquiry for the same purpose had been made in other places and neighbourhoods, as follows:—Stoke-upon-Trent, Wolstanton, Bromsgrove, Alcester, Sheffield, Penzance,

Redruth, Reeth, Middleton, Pateley Bridge, Macclesfield, Leek, Leeds, Bradford, Stroud, Melksham, Leicester, Hinckley, Preston, Towcester, Newport Pagnell, Berkhamstead, Yeovil, and Saffron Walden.

Inquiry into  
Adult Mor-  
tality from  
Lung-diseases.

The inspections of 1861 were, like those of 1860, made by Dr. Greenhow.

(i.) The inquiry starts from a statistical basis. An investigation of the death-registers had shown that in certain districts of England—districts which are specially the seats of particular kinds of industry—grown-up men or women die from diseases of the lung, or from some of such diseases, three times, four times, even six times as abundantly as in other districts of England. And the object of the inquiry was to trace this effect to its causes. Especially—since the great local excesses of lung-disease go with certain industrial relations of the people, it was necessary to ascertain, with regard to each inspected place, what definite causes of lung-disease are involved in the particular local industry.

Origin and  
scope of the  
inquiry.

The occupations, which have thus had their sanitary circumstances reviewed, are some of the largest branches of popular industry:—*cotton-work*, *silk-work*, *flax-work*, and *wool-work*, in their several respective departments, at Preston, Blackburn, Macclesfield, Leek, Coventry, Pateley Bridge, Leeds, Bradford, Stroud and Melksham; the *making of earthenware and china* at Stoke-upon-Trent and Wolstanton; the *manufacture of watches* at Coventry; the *making of hosiery* at Leicester, Hinckley, Nottingham Radford and Basford; of *straw-plait* at Tring, and Berkhamstead, and of *lace* as Towcester, Newport Pagnell, Nottingham, Radford and Basford; *tin-mining*, *copper-mining*, *coal-mining*, *iron-mining*, and *lead-mining*, at Redruth, Penzance, Wolverhampton, Merthyr Tydfil, Abergavenny, Reeth, and Pateley Bridge\*; the *smelting of metals* and the *making of metallic instruments*, large and small, at Merthyr Tydfil, Abergavenny,

\* Dr. Greenhow, two years before, had on his own account studied the case of lead-mining at Alston Moor; and his report of 1860 on the lead-mining of Reeth and Pateley Bridge was strengthened by what he had learnt in 1858 at Alston.—J.S.

Origin and  
scope of the  
inquiry.

Wolverhampton, Bromsgrove, Alcester, Aston, Birmingham, and Sheffield; also, at the latter two places, the *making of miscellaneous knick-knacks* from pebbles, shells, ivory, horn, wood, gutta percha, &c.

General results  
of the inquiry.

(ii.) The results of this very large inquiry are, in one sense of the word, satisfactory. They answer the question which claimed investigation. They establish in detail what had appeared generally in the statistics. They explain how it is that the inspected occupations are so hurtful to those who follow them,—how it is, that, in much of our best national industry, the workman, by reason of his work, loses some considerable part of his life.

Want of venti-  
lation in in-door  
work-places.

a.) In the first place, apart from whatever unwholesome influences belong to the special nature of this or that industrial process, it has appeared to be the general fault of the inspected in-door employments, that the work-people are apt to pass their day—often a very long day—in rooms which are more or less unwholesome through want of ventilation. In a very large proportion of cases this unwholesome condition prevails to such an extent, that deaths by phthisis and by other tubercular and scrofulous diseases might be expected abundantly to result from it.

The evil occurs under different industrial circumstances:—one industry is followed in the houses of the work-people another with more or less aggregation in common work-places. But throughout the whole scale, from the humblest cottage industry even up to the highest developments of our factory system, amid infinite differences of occupation, the same great removable evil abounds. And in scene after scene of honest industry and independence, the medical eye sees monotonously this one terrible shadow of suffering and death.

For details illustrating the general statement I refer to the inspector's reports;—to what he says of the life led by straw-plaiters, lace-makers and glovers at Berkhamstead, Tring, Towcester, Newport Pagnell, Nottingham, Radford, Basford and Yeovil; of the life led by watch-makers at Coventry; of the life led by button-makers, jewellers and

various knick-knack-makers at Birmingham and Sheffield; of the life led by stocking-makers, especially such of them as work with the old knitting frames, at Leicester, Nottingham, Radford, Basford and Hinckley; of the life led by pottery artisans, especially by the decorators of earthenware, at Stoke and Wolstanton; of the life led by factory operatives employed on cotton, silk, flax and wool, at Preston, Leeds, Bradford, Pateley Bridge, Macclesfield, Leek, Stroud, Melksham, Coventry and Blackburn, and by operatives, not under the Factory Act, employed at some of these places in particular branches of the same industries.

Duly to appreciate the evil of an unventilated work-place in any of the cases referred to, one must have under consideration the whole life of the artisan who suffers from it, and all the circumstances of his industry. One must remember that, in most cases, either the artisan's ill-ventilated work-place is also his ill-ventilated dwelling-place, or else the dwelling-place to which he goes for his rest is as ill-ventilated as the work-place which he leaves; that during a great part of the year the work-place has artificial light in it, in many cases gaslight, for some hours of the day, and in some cases has its atmosphere vitiated by other products of combustion; that in factories during winter the commonly adopted method of warming is one which itself makes the air unpleasant, if not hurtful, for breathing; and that in many branches of industry (in instances to be hereafter adverted to) good ventilation is essential as a safeguard against evils which are special to the employment—essential for the removal of an injurious dust, or for the abatement of an oppressive temperature. One must remember, too, that the artisan's in-door employment is essentially dull and cheerless, is in a large proportion of cases sedentary, and is in some cases combined with an almost deforming constraint of bodily posture,—that the working day thus spent is commonly of at least 10 hours duration, and sometimes extends to 12, 14, and even 16 hours,—that such life, at its best, is not wholesome,—that with the scanty or monotonous bodily exercise which it implies, with the seclusion from what is beautiful and animating in external nature, the artisan's standard of health



Want of ventilation in in-door work-places.

is necessarily low,—that probably his occupation, even without aggravating circumstances, gives him, proportionately to his length of daily work, a heightened liability to tubercular disease,—and that, among the aggravating circumstances which may indefinitely increase this evil, probably none is so effective as the bad ventilation of his work-place.

Atmospheres which specially irritate the lungs.

b.) In the second place, it has appeared that in many of the inspected employments there are special sources of danger to the lung, by way of direct irritation; and that against these various special dangers little effectual precaution is taken.

Thus, in some gigantic branches of our national industry—such as the textile manufactures, the manufacture of earthenware and china, the manufacture of steel and iron, and in many less extensive occupations, work-people in large numbers, sometimes nearly all who are employed in particular departments of the business, break down prematurely with lung-disease, under pressure of the mere dustiness of their occupation. For, in the cases referred to, the “dustiness” in the occupation implies that the artisan, during his dust-making work, draws at each breath into his air-tubes a notable quantity of finely divided metal, grindstone, flint, clay, shell, ivory, bone, charcoal, wool, cotton, flax, silk, or other material which is in use; and, putting aside all question of the immediate inconvenience thus occasioned (which presently ceases to attract the artisan’s attention) the gradually accumulating consequences of the habitual irritation are—primarily, confirmed bronchitis, and secondarily, in the graver cases, an irreparable destruction of lung-texture.

Again, in the operation of mining there is, as will presently be shown in detail, special danger to the lung, from influences which, if not very successfully dealt with, render the subterranean atmosphere both chemically and mechanically unfit for respiration. And so imperfect hitherto has been the adoption of safeguards against this danger, that, with one very notable exception, miners, as a class—and the class includes in England alone more than 300,000 workmen—break down prematurely with bronchitis and pneumonia, caused by the atmosphere in which they labour.

In other branches of industry there is the influence of working in an atmosphere much altered by heat, and of alternating between that atmosphere and the common, perhaps wintry and inclement, outside atmosphere. In many of the inspected occupations, bronchitis, attributable to this influence, appears to be extremely frequent:—both in cases where the hot industrial atmosphere is very moist and steamy, as in the slip-making department of potteries, and in the so-called “roving,” or wet-spinning department of flax factories; and also in cases where the industrial atmosphere is high dried by heat,—especially if the dry heat be (as it commonly is) an attendant circumstance of defective ventilation, or co-operate with other influences likely to irritate the lungs (as in dusty departments of earthenware making and of textile industry) or be combined with the hurtfulness of accumulating gases from combustion, as in the instance of hand-woolcombers, who work with unchimneyed furnaces beside them.

(iii.) In order to illustrate the preceding observations, it may be convenient that I refer, with some detail, to a few typical cases where such evils as I have adverted to attain their largest dimensions. And for this purpose I submit the following instances:—

a.) In metallic manufacture, the grinders and polishers of steel are the worst sufferers. Their work—abundantly illustrated in the inspected districts of Bromsgrove, Alcester, Sheffield, Aston, and Birmingham—consists in giving final shape and smoothness to the edges, points and surfaces of innumerable steel instruments—knives, forks, razors, scissors, chisels, needles, saws, files, scythes, swords, bayonets, gun-barrels, fish-hooks, gimblets, spindles, fire-irons, &c.; and as this final shaping and glazing of hard metal is done by the rub of revolving grindstones and emery wheels, dust is of necessity produced in every step of the process,—dust, which may be extremely fine, but is of almost adamantine hardness. The diffusion of this dust into the air of work-places is not nearly so great in wet-grinding as in dry-grinding; for in wet-grinding the surface of the wheel as it revolves dips into

Atmospheres which specially irritate the lungs.

Illustrations of the production of industrial lung-disease.

Grinders and polishers of steel.

Grinders and  
polishers of  
steel.

water, and carries thither a large proportion of the detritus which otherwise would be diffused into the air; but even in this case there continues a perceptible diffusion of the dust, and unfortunately the grinder suffers a special inconvenience in the damp to which he is habitually exposed. Moreover, the dust of mere grinding and polishing is by no means the only dust of the work-places in question. For, first, each grindstone, when new, must itself be rough-ground into shape by the workman; and afterwards, perhaps twice or thrice a day, its worn surface must be fresh roughened for use; and in these processes of "razing" and "hacking," as they are called—processes which dry-grinding and wet-grinding have in common—great clouds of grit, rising from the wheel, first densely envelop the operator and then diffuse through the work-place.

It has long been known that the spray of these processes makes a deadly atmosphere for men who breathe it; and against this great evil some not inconsiderable pains have been taken. To a great extent it is now the case that the dry-grinder's wheel moves in a partial wooden casing, from within which the dusty air is constantly being drawn by a revolving fan into an air-shaft away from the workman. Yet, notwithstanding this contrivance, the employment continues greatly hurtful;—first, because the ventilated wheel-box is used only in dry-grinding; secondly, because in dry-grinding it is not universally used; thirdly, because, even where it is used, there still escapes into the work-place a considerable residue of dust from the processes of grinding and glazing; and, fourthly, because it has no sensible influence on those clouds of dust which the processes of razing and hacking engender.

The report made of the health of grinders is, that few of them work continuously for many years without suffering more or less from the occupation. At first there is oppression at the chest, followed by shortness of breath, cough, and expectoration; symptoms which advance slowly, and attract little notice, till they get aggravated by catarrh; after a while, the bronchitis which they indicate gets complicated with solidification of the lung; and eventually, it is said, the lung

undergoes changes of an ulcerative kind. Among 21 grinders, Grinders and  
aged thirty and upwards, whom Dr. Greenhow examined at polishers of  
Birmingham, 15, though still at work, were suffering more or steel.  
less from shortness of breath, cough, and expectoration,—some  
of them so severely as to be almost incapacitated for labour.\*

b.) In the manufacture of earthenware, the chief sufferers China-scourers  
are the china-scourers and certain of the potters. and potters.

China-scourers remove loose flint-powder from the baked china; and in doing so (partly by brushing, partly by rubbing with sandpaper) they send much flint-dust into the atmosphere about them,—a dust, which is lighter and floats more obstinately in the air, in proportion as the earthenware is fine. This dust, inhaled into the lungs of the work-people, is a terrible irritant to the bronchial surface which it invades. The women (for the occupation is a female one) soon get habitual shortness of breath, with cough and expectoration; very often they have bleeding from the lungs, sometimes also from the nose; and their chronic disease is from time to time accelerated by more acute catarrhal attacks, to which they are particularly subject. Comparatively few china-scourers continue very long at the employment. All who continue at it become, sooner or later, "asthmatical."† Those who

\* Not many grinders suffering from the characteristic disease could be induced to submit to stethoscopic examination; but of those whom Dr. Greenhow examined at Sheffield he reports,—“Several were suffering from chronic bronchitis, and others, in a more advanced stage of the disease, afforded evidence of consolidation of the lungs. The cases examined were not sufficiently numerous to determine the frequency of the latter condition, and the only patients who, on examination, afforded evidence of the existence of cavities in the lungs, were young men under 30 years of age.”—J.S.

† “A scourer who had worked eight years, and was suffering from chronic bronchitis, said, that four other scourers who were employed in the same room had died from the effect of the occupation since she had commenced it, and that a fifth was then at the point of death. In a third pottery, a woman who had worked ten years at the occupation asserted, that about 12 other scourers in the same shop had died since she entered it. Out of 13 china scourers, belonging to six or seven different potteries, whose evidence was taken, only four were in good health; nine were suffering in consequence of their occupation. Of the latter, three were suffering from an advanced stage of chronic bronchitis, attended by great difficulty of breathing; four had suffered from hæmoptysis; and the others all had more or less shortness of breath, cough, and expectoration. The eldest of these women was 50 years of age, two were over 40, and four were under 30 years of age. One of the latter was among those whose health had given way under the employment.”—J.S.

China-scourers  
and potters.

relinquish it in time are said occasionally to regain perfect health; but for the greater number the mischief is reported to be irretrievable. Against the danger of this occupation scarcely any provision has been made. In one of the potteries visited (says the inspector) "the china was placed upon a small moveable turn-table, for the purpose of being scrubbed with sandpaper, an arrangement by which the dust was kept at a greater distance from the mouth of the scourer than when held in the hand. In another pottery the china was being rubbed within the opening of a sort of canvas tube or windsail, up which a draught of air carried a considerable portion of the lighter dust. In most potteries, however, no special precautions are employed to prevent the dispersion of the flint-dust into the atmosphere."

Potters (including in this term all the various shapers of earthenware,—flat-pressers, hollow-ware-pressers, throwers, turners, and sagger-makers) are exposed in different degrees to the influence of a dusty atmosphere; all in a less degree than the china-scourers, but some of them, especially the flat-pressers, in a degree which is most injurious to health.\* The mechanism of the nuisance to which they are exposed is this:—shavings of the potters' dough fall abundantly about the work-place; they rapidly dry upon the floor, more rapidly as the room is more hot; they are then easily convertible into powder; and this powder rises into the air of the room in proportion as the business there is one of much bustle and movement. How flat-pressers come to be especially sufferers by dust, and how, not only in their case, but in that of potters generally, the evil varies in amount, with varying arrangements of a work-place, may be illustrated by the following quotation:—"Articles made by flat-pressers are sent, immediately, to dry in a closet or stove heated

\* Out of 37 flat-pressers, taken indiscriminately in several potteries, 20 suffered habitually from bronchial irritation (or potters' asthma, as it is termed); and only 17, most of them younger men, declared themselves to be healthy; out of 16 hollowware-pressers, 8 only considered themselves healthy; the others were all suffering, more or less, from dyspnoea and cough. Out of 14 turners only 4, and out of 16 mould-makers, only two, were asthmatical.—J.S.

by a furnace. These stoves are placed in the workshop, and frequently, especially among plate-makers, close to the operatives, so that the atmosphere in which they work is of an elevated temperature, and very dry. The ware is carried into the stoves by boys, who are very young, and are kept running to and fro all day, thereby filling the atmosphere of the shops with dust. The quantity of dust varies according to the cleanliness of the place. Some workshops are swept daily, others only once a week, and of course the operatives employed in the latter are more exposed to inhale dust than those in the former. The temperature of the workshops depends partly upon the sufficiency of the supply of moulds. When the men are well supplied with them, it is not necessary to hasten the process of drying, and the stoves need not be so highly heated. When, on the other hand, there is a deficiency of moulds, the potters endeavour, by way of compensation, to hasten the process of drying, in order that the moulds may again be soon ready for use."

c.) As regards textile manufactures, illustration may be taken from cotton-factories and flax-factories.

In cotton-factories, the carding-rooms are by far the most injurious. They employ many operatives—sometimes even a third of the whole establishment. All employed in these rooms inhale a dusty atmosphere, with much cotton-fibre diffused in it. Some of them are exposed to special aggravations of the nuisance; the card-strippers, for instance, who remove adherent cotton from the carding-engine, and who during this process surround themselves with an extraordinary amount of dust; and still more the card-grinders, who, in the daily process of grinding the engines, share the liability of ordinary dry-grinders to inhale a metallic dust. The influence of the ordinary carding-room atmosphere on persons regularly employed in it is such, that, apparently, few carding-room operatives reach fifty years of age without having acquired an amount of chronic bronchitis which at no distant time disables them. Yet evidently the evil is in great part controllable. Partly, no doubt, it varies in degree according to the quality of cotton which is in work; but also it greatly varies



Cotton-carders. according to the arrangements of the work-place,—is lessened in proportion as the room is lofty and ventilated, in proportion as the carding-engines are closely covered, and in proportion as means are used to modify the more dust-producing processes. For example;—in some factories the carding-engines, when about to be ground, are taken out of the room; in some, the grinding is done by a machine which supersedes manual labour, and to a great extent saves the grinder from metallic dust; and in some there are carding-engines so constructed that with them no stripping process is necessary. Also, it was remarked by a manufacturer, that “a large portion of the dust and flue which escape into the atmosphere of the rooms might be intercepted and carried away by means of properly constructed flues and fans, but that the expense, both of the machinery, and of additional steam-power to work it, is a barrier to their being employed.”

Flax-workers. In flax-factories, the production of disease is terribly great. A very irritating dust, more or less abundant according to the quality of flax, is produced in the processes of hackling, carding, line-preparing and tow-spinning. The casual visitor who breathes this dust gets at once a sense of oppression at the chest; and the operative who habitually breathes it rarely attains mid-life without suffering more or less from bronchial disease. Of 107 operatives whose evidence was noted by Dr. Greenhow (operatives taken by him quite indiscriminately—young and old, well-looking and ill-looking—but all employed in more or less dusty departments of the manufacture) 79 were suffering or had suffered from the bronchial irritation; and in 19 of the 79 there had been hæmorrhage of the lungs—in some cases again and again. In certain of these dusty departments, the suffering is greater than in others:—hacklers, especially hand-hacklers suffer very greatly; among 27 of them whom Dr. Greenhow examined, 23 were diseased, and 5 had had hæmorrhage from the lungs. Many of the older operatives “are seen at a glance to be short-breathed; “the rounded shoulders, emaciated frames, prominent eyes, “and laborious wheezing respiration, all clearly show that “they suffer habitually from dyspnoea; indeed it is marvellous to see men in the condition of some of the hand-

“hacklers still able to continue at their labour; a circumstance probably ascribable to the very slow and gradual progress of the disease.”

The effects of the dusty work-place are not confined to the lungs: often the stomach gets deranged by the quantity of swallowed dust; often ophthalmia (especially at the margin of the eyelids) is produced; often the voice becomes hoarse; and sometimes there is bleeding from the nose. Not a few operatives desert the occupation in consequence of the misery it occasions them: but new sufferers succeed; and many get a certain degree of acclimatization, with which they go on, patiently bearing the gradual progress of disease, till presently, in mid-life, or soon afterwards, their employment brings them to helplessness or death.

In flax-factories, as in cotton-factories, the fatal nuisance of dust is, to no small extent, controllable. Not only will it be greatly affected by the general ventilation of the work-place, but machines may be so covered as to prevent much dispersion of dust from them, and ventilating flues may be so arranged that dust is drawn away almost in the moment of its production. In some cases the inspector saw appliances of this kind in operation. But in other factories, says his report,—“either no means at all, or very inadequate means, “are employed for preventing the dispersion of dust into the “atmosphere, and, of course, the operatives suffer in consequence of this inattention of the master.

d.) In our mining industry there is only one broad exception to the rule, that miners, as a class, break down prematurely with lung-disease. That exception is of signal importance; so also are some minor differences of degree which may be named; and to these I will directly return. But first, with regard to that which unhappily is the rule,—what are the circumstances under which the miner’s lung-disease is contracted?

The miner, like the indoor operative, often spends his day in an ill-ventilated work-place. But the non-ventilation from which he suffers is associated, in its existence and its consequences, with conditions special to the subterranean employment, and far more complex than those which belong

Miners.

to the non-ventilation of common work-places. The air in which he works is air which for his safety's sake ought pre-eminently to be ventilated; for in most cases, not only the exhalations of human labour, but gases indigenous of the mined earth, or gases from gunpowder burnt in rock-blasting, tend incessantly to gather round him at his work, as an atmosphere quite unfit for respiration. Nor is it always only on that account that ventilation is important to the miner; for against the dust and smoke which abound in many mining operations, against the heat which in deep mines grows with every considerable descent, and against the terrible danger of fire-damp, ventilation is the one possible corrective. The air in ill-ventilated mines must be very greatly more impure than the air of ill-ventilated above-ground places. So considerable must be its defect of oxygen, so considerable its excess of carbonic acid, that, not only must it be insufficient, often almost urgently insufficient, for healthy respiration, but in many cases, I apprehend, must interpose an appreciable physical obstacle to the free circulation of blood through the lungs. And the same air, besides being chemically insufficient for respiration, also carries with it into the miner's lungs more or less irritant material,—material, which, though the air were ever so well oxygenated, would itself tend to produce bronchitis—grit, namely, and soot and the acid fumes of combustion. The miner, meanwhile, is not at sedentary employment, like many indoor operatives, but is doing arduous muscular work for many consecutive hours,—work which claims full service from all his apparatus of respiration.

When, on the one hand, it is considered how very hurtful to the lungs must be the atmosphere of an ill-ventilated mine, and when, on the other hand, it is considered that, without much expenditure of skill and money, the ventilation of mines is not possible, nor even with such expenditure always easy,—there could be no wonder though the miner almost invariably got lung-disease. And in fact, under the too common circumstances of the employment, his health-history is this:—that even at an early age the respiratory mucous membrane begins to suffer; that for a time there

may be only hoarseness or wheezing, or slight oppression at the chest; that shortness of breath, cough and expectoration succeed, and gradually become habitual—the expectoration of course being characterised by an admixture of whatever dust or soot has entered and is irritating the lungs; that, if there be personal predisposition to tubercular phthisis, this disease very early develops itself; that, barring phthisis, the bronchitis goes on, probably often with more or less super-addition of pneumonia, and sometimes with the complication of emphysema; that the sufferer becomes very susceptible of acute catarrh, which, with successive attacks, rivets more and more closely the hold of the chronic disease, and aggravates at last, often to a fatal amount, the urgency of its previous symptoms; that presently the ordinary complications of long-continued bronchitis arise—heart-disease (which perhaps is in some cases specially promoted by special circumstances in the occupation) and, with heart-disease, various dropsical symptoms.

Happily, as I have observed, to run this painful course is not indiscriminately the law of mining existence. One class of miners—that of the Northumberland and Durham colliers, forms a striking exception. So far as existing mortuary statistics enable a judgment to be formed, these miners, as compared with other classes of the community, do not suffer any important excess either of pulmonary or of other disease; and, were it not for the chances of violent death which surround them, their employment might be deemed fully compatible with an average expectation of life. On the other hand, the rule, to which these colliers are the exception,—the rule, that employment in mines causes pulmonary disease, and leads to premature disablement and death, is illustrated in the mortuary statistics of Redruth, Penzance, Abergavenny, Merthyr Tydfil, Wolverhampton, Alston, Reeth and Pateley Bridge, and in the facts which their Lordships' inquiry has elicited with regard to the sanitary state of the mining populations in those places respectively; though, again, even among these suffering populations, the pressure of pulmonary disease varies not inconsiderably in its amount.

Miners.

The healthiness of the northern coal-miners, and the lesser degrees of suffering among some of our other miners, correspond to the different degrees of ventilation in the mines where those miners are engaged. In the northern coal-mines good ventilation is the rule; in the copper-mines and tin-mines of Cornwall, in the lead-mines of Reeth, Alston and Pateley Bridge, and in the iron-mines and coal-mines of Wolverhampton, Abergavenny and Merthyr Tydfil, good ventilation is the exception. Yet even with regard to the latter classes of mines testimony is borne to the effects of relatively good ventilation; not only as evidence that in recent times ventilation has almost universally been improved, and therewith the miner's occupation been made less fatal to him; but likewise as evidence on the comparative ventilation and comparative unwholesomeness of mines.

Thus, among the Welsh miners, it was said that "in some mines the smoke [of gunpowder-blasting] is rapidly carried away by the ventilating current, while in others it lingers for a long time. It was distinctly stated of one mine, that the smoke is swept away from the face of the work, where the men are most exposed to inhale it, in a few minutes after the explosion, whilst the atmosphere of other mines was said to be scarcely ever free from smoke, which only disappeared by what the miners expressively call 'dying away.' The miners employed in the former were reported, by the manager, the surgeon, the overman, and by some of the men themselves, to be nearly exempt from miner's asthma; while it was ascertained of some of the latter, that almost all the men become asthmatical as they advance in life. These are, indeed, extreme cases, the one being the best and the others probably among the worst ventilated mines in the district; but there are also other mines of every intermediate variety as regards the efficiency of their ventilation."

Thus, again, in the Wolverhampton district (where there was much difference in the ventilation of mines) evidence was repeatedly given,—that the men suffer in proportion to the dust and powder-smoke diffused through the atmosphere of the mine,—that this depends on the greater or

less inefficiency of the ventilation,—that the well-ventilated Miners. mines are much less injurious to health than such as are ill-ventilated.

And equally, among the lead-miners, evidence to the same effect was given; evidence which is the more important because they, of all miners, are probably the most suffering class. Differences indeed were spoken of, dependent on geological circumstances of the mine,—that mines in some strata would be dustier than mines in other strata; and no doubt this is the case. But the great difference was the difference of ventilation,—a difference which of course makes itself more felt in proportion to the dustiness and other impurity of the mine. As it was better or worse, the miner's time for disablement varied. In one mine which was visited, all the men, it was stated, became short breathed before the age of forty; while in another mine, few, it was said, suffered materially till after fifty. And in other like ways it made itself obvious in its effects:—"Men who have previously shown themselves but slightly affected, being thereby less able to resist the deleterious influences attendant on mining than men in health, often break down rapidly on being removed to a 'wind-less,' that is an ill-ventilated place of work. On the other hand, timely removal to a better situation often proves an effectual means of checking the progress of the complaint. Several lead-miners who, feeling their health injured by their occupation, had either worked for a time at coal-mining, or at some employment on the surface of the earth, asserted that they had by this means very much mitigated their ailments, some of them having subsequently been able to resume their original occupation."

e.) With reference to the unwholesome circumstances under which domestic manufactures are commonly carried on, the cases of the straw-plaiters at Berkhamstead and Tring, of the glove-makers at Yeovil, of the lace-makers at Towcester and Newport Pagnell, and of many silk-operatives at Leek, seem to me deserving of particular attention; the more so, because women and children—in some cases very young children—are the principal sufferers in these manufactures.

Unwholesome  
circumstances  
of domestic  
manufactures.



Detailed information as to these branches of industry is in the Appendix of my last year's report; but it will be convenient to quote here some passages on the subject.

Straw-plaiters.

At Berkhamstead and Tring women and children are engaged in straw-plaiting. "The manufacture is carried on at home . . . . . The cottages of the labouring classes in Berkhamstead are usually small, ill-ventilated, and very frequently dirty; this applies more particularly to the modern houses, which are worse constructed and worse ventilated than the older ones . . . . . The cottages of Tring are, upon the whole, larger and better than those of Berkhamstead . . . . . Even these larger dwellings are sometimes too small for the number of their inmates . . . . . Young and even married women, when they are able to do so, work from 10 to 14 and sometimes even to 15 hours a day; the average certainly being 12 hours." Except in fine weather, when the doors of the cottages are kept open, and the women sometimes sit in the open air, or walk about at work, these long hours are devoted to a sedentary occupation in badly ventilated cottages of very limited dimensions. Children begin to learn the manufacture of straw-plait very early; often at four years of age. In the first instance they are generally taught by their mothers; but at about five years of age, and sometimes even sooner, they are sent to the plaiting schools, where each child has an allotted task to perform during the day. The work at these schools is done on behalf of the mothers, who provide the straw, and fix the amount of plait which their children are expected to make during the day, paying the school-mistress a certain sum per week for her superintendence. The hours of attendance at these schools are long [by rule 8 to 9½ hours; but liable to be prolonged for children who have not done their allotted task]; and the schools are held in rooms almost invariably over-crowded, the atmosphere of which must in winter be much impaired by the respiration of so many persons."

Glove-makers.

At Yeovil "the manufacture of gloves is chiefly carried on in the dwellings of the industrial classes. The rooms are frequently small, low, and deficient in ventilation; the

"cottages often having neither back doors nor back windows . . . . . The domestic branch of the glove manufacture is almost exclusively carried on by women and girls, who work in the small, ill-ventilated rooms of their cottages, and sit very close at their employment during many hours of the day. It is said that sometimes when work is very pressing they devote as many as sixteen hours a day to their labour; but it was established without doubt that they commonly work 12 or 13 and frequently 14 hours out of the 24. Indeed it was plainly stated by some of the more intelligent women, that female glovers who have to earn their own maintenance must work very diligently and sit very closely to their labour. The occupation is entirely of a sedentary nature, and the women sitting upon low seats constantly stoop much over their work, which is fixed in an upright stand called an engine . . . . . The women engaged in the manufacture of gloves in their own homes rarely go out of doors . . . . . Young girls begin the business of glove-making sometimes as early as the age of seven, but commonly at that of eight or nine years. It is usual for mothers to set their children a certain amount of task-work, which must be completed before the close of the day."

Glove-makers.

At Towcester and Newport Pagnell the female population is largely engaged in lace-making, "which is in both places a domestic occupation. . . . The dwellings of the labouring classes both in Towcester and Newport Pagnell are often very small, over-crowded, and ill-ventilated. Many of them being without back doors or windows, do not possess the means of thorough ventilation. The bed-rooms are often entered one through the other, and in many instances there is no chimney in either of the sleeping apartments . . . . . Even in many of the cottages of larger dimensions the internal atmosphere is stagnant at night, owing to the absence of chimneys, or to the fact of their being closed up to exclude draughts of air. Such rooms always have a close, stifling smell to strangers coming from the open air, even though they be sufficiently capacious. . . . . The women employed in the manufacture of lace-work for 9, 10, or 12

Lace-makers.

Lace-makers.

" hours per day, and occasionally even longer. The work is  
 " done in the cottages during the greater portion of the  
 " year . . . . During the winter, when the women work en-  
 " tirely within doors, every crevice or chink through which  
 " a draught of air could find entrance is carefully stopped.  
 " The women are said very rarely to leave the immediate  
 " vicinity of their dwellings, and to take but little exercise  
 " in the open air, and that for the most part late in the  
 " evening, regardless of weather, and often very imperfectly  
 " clad. The inmates of neighbouring cottages sometimes  
 " assemble in the same room to work in company, particu-  
 " larly at night, when artificial light is required, a single  
 " candle thus serving for several workers, each of whom has  
 " a globe filled with water, supported on a wooden stand,  
 " placed between the candle and her work, upon which it  
 " concentrates the light . . . . Their sedentary mode of life  
 " renders the women liable to suffer from cold feet in the  
 " winter season; to obviate which annoyance many of them  
 " are accustomed to place a sort of chafing dish, filled with  
 " embers from the fire, or, it was said, with ignited charcoal,  
 " beneath their dress, a practice which, of course, tends to  
 " vitiate the atmosphere of their small ill-ventilated cottages.  
 " Children are, if possible, even more exposed than adults to  
 " some of the pernicious influences attendant upon the occu-  
 " pation of lace-making. Girls begin the work as early as,  
 " and sometimes earlier than, seven years of age. Partly for  
 " the purpose of learning the business, but chiefly in order to  
 " be under the superintendence of a mistress, they are usually  
 " sent to a lace school, where they are expected to make a  
 " given amount of lace in the course of a day. The hours of  
 " attendance in these schools vary somewhat, according to  
 " the age of the children, and the custom of the place . . . .  
 " From eight to ten hours per day appears to be the more  
 " usual duration of labour in these schools both in Towcester  
 " and Newport Pagnall. As in the plaiting schools, so here  
 " likewise, the children must complete their appointed task  
 " before leaving, and, failing to do this, are detained until it  
 " is finished. The schools are held in ordinary cottages, and  
 " are often much overcrowded. . . . From the position which

" they occupy while at work, the children employed in this Lace-makers.  
 " trade very soon become round shouldered and narrow  
 " chested. . . . Lace is made upon circular pillows or cushions,  
 " stuffed with straw which rest at one side upon a sort of  
 " wooden frame, and at the other upon the knees of the  
 " worker, who [except where a special contrivance is used] is  
 " thus compelled to maintain a more or less constrained posi-  
 " tion. . . . The cushions are usually placed so low that the  
 " worker is compelled to stoop over her work, and the arms  
 " being habitually brought forward, in order to enable the  
 " women to handle the bobbins, lacemakers are apt to become  
 " round-shouldered, and, their chests being contracted, the  
 " act of respiration, particularly when the cushion rests on  
 " the knee, is not freely and efficiently performed."

In Leek, exclusively of persons employed in silk-mills under Silk-workers.  
 the Factory Act, " a great number of very young children,  
 " from eight years of age upwards, work at home, or in wind-  
 " ing-rooms, or other work-places, which do not come within  
 " the jurisdiction of the inspectors. In some of these places  
 " children are employed to turn the wheel that moves the  
 " machine, an employment at which they are engaged for at  
 " least 10 hours in the day. Thus, in a thread manufactory  
 " 24 women and girls were employed in the winding-room at  
 " the time of visit. The wheels that moved the winding  
 " machines were turned by two boys, of the respective ages  
 " of 8 and 9 years. Probably it would not pay to employ  
 " steam-power in so small an establishment; but its absence  
 " enables the proprietors of these small factories to escape the  
 " restrictions imposed by the Factory Act. About 21 persons  
 " were employed in another small winding establishment.  
 " The wheel was here turned by a man; but 10 little girls,  
 " some of them not more than 8 or 9 years of age, and only  
 " one or two as old as 11, were working 10 hours a day. In  
 " a third establishment of the same kind, 18 or 20 of the  
 " operatives were girls between the ages of 8 and 12 years.  
 " Including men, women, and children, 51 operatives were  
 " here crowded into a space which, including that occupied by  
 " machinery, consisted of 10,000 cubic feet, thus affording an  
 " average of less than 200 cubic feet per head. The machines



Silk-workers. " were moved by a wheel turned by a man ; ventilation was  
 " most imperfect ; in fact, practically, there was none, for the  
 " windows opened so exactly in a line with the heads of the  
 " workers, that they could not bear them open while at work.  
 " The duration of labour was 10 hours per day. There are  
 " many other work-places of the same kind in Leek, in each  
 " of which from five or six to a dozen persons are employed ;  
 " but most of these places may be regarded as rather in the  
 " light of domestic work-rooms than of factories. .... Both  
 " weavers and 'piecers' (i.e. the women and children who tie  
 " together the ends of silk which breaks while winding from  
 " the 'swifts' on to the bobbins) work in a constrained position.  
 " Silk-weavers sit at their looms, with the body leaning  
 " forwards, and the lower part of the chest firmly pressed  
 " against the wooden beam on which their work is rolled,  
 " thus compressing both the stomach and chest ; their arms  
 " are habitually brought forwards while at work, and they  
 " are thus apt to become round-shouldered and narrow-  
 " chested. .... Weavers, like many other operatives, are liable  
 " to suffer from working in close, ill-ventilated work-places,  
 " either in factories or at their own homes. .... Piecers, and  
 " especially children, besides often working in badly ventilated  
 " rooms, stoop much at their work. They work in a stand-  
 " ing position, and have a certain amount of exercise in  
 " moving backwards and forwards along the frame for the  
 " purpose of tying the broken ends, but in doing this they  
 " usually have occasion to stoop forwards. The precise  
 " influence of this position cannot be accurately estimated,  
 " seeing that it is associated with working in close, ill-venti-  
 " lated rooms ; but piecers appear from the death register to  
 " contribute an undue proportion of the mortality from pul-  
 " monary diseases. Much of the work on which piecers are  
 " employed is done at home, or in winding shops, not worked  
 " by steam power, and, in this case children of both sexes, but  
 " principally girls, are employed irrespective of the restric-  
 " tions either as regards hours of labour or the age at which  
 " they are put to work, imposed by the Factory Act. ....  
 " The deaths of young girls employed in the silk manu-  
 " facture have been very numerous in both Macclesfield and

" Leek ; but there are no accessible data from which to cal- Silk-workers.  
 " culate the proportion their deaths bear to those of the rest  
 " of the population of the same age and sex. .... The sleeping  
 " apartments in the cottages at Leek are frequently destitute  
 " of chimneys, and the windows, opening but imperfectly,  
 " their ventilation is most inadequate ; and yet, upon the  
 " whole, the dwellings of the labouring class are superior to  
 " those in many agricultural districts."

(iv.) With regard to the all important question—whether it Preventability  
 be possible, without impeding the proper march of industry, of industrial  
 to reduce those great attendant evils which their Lordships' lung-disease.  
 inquiry has demonstrated,—I am happy to say that the in-  
 spector's reports teem with statements which justify, for many  
 of the occupations, a decidedly affirmative answer, and for the  
 other occupations at least a very hopeful opinion.

That, where domestic manufacture is concerned, the domes-  
 tic ventilation might be amended, and the domestic crowding  
 be restricted, may, I suppose, be taken as self-evident. And  
 that the employment of children in certain of these manufac-  
 tures might be so amended in its conditions, as no longer to  
 be almost cruel in amount and unwholesomeness, is also  
 evidently an attainable improvement. That where factory-  
 work is concerned, the factory ventilation might be amended,  
 and factory crowding be restricted, is shown by the many  
 contrasts of good and bad which abound in the inspector's  
 reports,—contrasts between factories in any one given place  
 and devoted to any one given industry,—contrasts which show  
 a well-ventilated and comparatively wholesome factory side by  
 side with one which may even stink with the exhalations  
 of its inmates.

That the bronchitis-producing influences special to particular  
 branches of industry, may also, without detriment to the  
 respective industry, be largely reduced or abolished, is shown  
 by similar evidence. There are the contrasts of good and bad,  
 the differences of bad and worse, to which I have adverted  
 in speaking of the particular occupations. In mining, for  
 instance, there is the comparative perfection of the north-  
 country coal-mines to point to ; and there are the differences,

Preventability  
of industrial  
lung-disease.

well known in their respective districts, between well-ventilated and ill-ventilated mines (whether copper-mines or lead-mines or tin-mines or iron-mines or coal-mines) in Wolverhampton, Abergavenny, Merthyr Tydfil, Penzance, Redruth, Pateley Bridge and Reeth. Similarly, in hackling-rooms, grinding establishments and the like, there are cases where the injurious influence is left at its maximum; others where it is considerably controlled. So again in the slip-making department of potteries, there is at least one case (that of Messrs. Copeland's establishment) where the injurious process of slip-boiling is dispensed with, in favour of another process which inflicts no injury on the workpeople.\*

Why are  
preventive  
measures  
against in-  
dustrial lung  
diseases not  
adopted?

(v.) Why, then, it may well be asked, do the various possible improvements, which would save so much human life and prevent so very much human suffering, remain, comparatively speaking, unadopted?

The sources from which reform could be initiated are three:—the voluntary action of employers of labour;—the demands and insistence of work-people; the coercion of law;—and respecting each of these, separately, something explanatory must be said.

First, as regards the employers of labour, they, in many instances, have given ample proof of good-will:—in every one of the injurious occupations, different establishments present different degrees of injuriousness; and, in those establishments where the better conditions exist, this superiority denotes that means of improvement have been voluntarily adopted by enlightened and kind-hearted employers. On the other hand, in many instances, the employer seems not to have given

\* It deserves notice that the extreme subdivision of labour, which marks our highly artificial system of manufacturing industry, is specially apt to illustrate the hurtfulness of particular industrial processes. Where only some small part of a manufacturing process is directly hurtful in its nature, the hurtfulness of that part might easily escape observation, or indeed might practically be of little importance, if every workman in the factory took his turn of it, as of other parts of the manufacture, and thus had for his share but a small exposure to the influence. But, under our existing organization of labour, the china-scourer is always china-scourer, the flax-hackler always flax-hackler, the steel-grinder always steel-grinder; and thus the evil effect of the occupation goes on accumulating in the individual. See also footnote at p. 64.—J.S.

any thought whatever to the matter—seems to be unconscious of any particular responsibility in regard of it—seems not to know, or for practical purposes, not to care, that he makes his commercial profits with an unjust and wasteful consumption of his neighbour's life. Again, in a considerable number of intermediate cases the employer has attempted to mitigate the unwholesome influences under which his work-people are suffering, and has failed through want of knowledge, as especially in the many unskilful endeavours which have been made to amend the ventilation of work rooms.

Secondly, as regards the work-people themselves, it is true that in a certain sense the matter is in their hands,—that they might rebel against needlessly unwholesome conditions of labour—might refuse to work in places where there is not reasonable care for their lives. But this theoretical power of the workman is in present practice a nullity. He cannot exact his sanitary rights. He could not do so unless he were one in a combination of claimants; nor even then unless, further, he had sufficient knowledge to shape demands for definite remedies. These conditions do not seem in any degree likely to be realised. Indeed, except with the most notorious occupational diseases, the workman seems but partially aware of the fatal circumstances under which he labours. The steel-grinder knows the cause of his "rot," and the potter or miner the cause of his "asthma;" but the many indoor operatives who contract phthisis through unwholesome conditions of labour are probably ignorant of the danger they incur. Even where the mischief is most flagrant, the workman sometimes has a short-sighted hesitation about the remedy—is apprehensive, lest, if his occupation were made harmless to him, his weekly wages would be made smaller. And especially he is jealous of new introductions of machinery, which in some cases might supersede hurtful processes of hand-labour. Then, too, the progress of disease is slow,—phthisis scarcely making itself felt till it has stealthily got an irresolvable hold on life—bronchitis a mere nothing for years, till gradually, very gradually, it grows to the pitch of chronic suffocation; both diseases, so small at first—so insidious; and the beginning artisan young and careless; and death far in

the distance. Doubtless there are very many instances where an individual artisan seeks work by preference in the more wholesomely conducted establishments of his business; and in cases where personal precaution counts for something, the individual workman is here and there found taking care of himself; but the inquiry has shown little of this kind of influence operating on compact masses of workmen. And it must be remembered that, among those who suffer from unwholesome industrial conditions, many defenceless persons are found,—many women, many mere boys and girls, many children.

Thirdly, as regards the intervention of any legally constituted authority,—no existing law is more than very imperfectly applicable to procure the mitigation of unwholesome industrial conditions.

Defects of ventilation are, in theory, dealt with under the Nuisances Removal Act; for, under that act, Justices can order proper means to be taken (and among such means "ventilation" is expressly included) for the abatement of any condition which is *injurious to health*\* in any "messuages, lands, or tenements, whether open or enclosed, whether built on or not, and whether public or private;"† and consequently it is part of the responsibility of local authorities under the Act (and it also lies within the competence of individual complainants‡) to move Justices to enforce the ventilation of work-places, wherever non-ventilation is demonstrably injurious to health. But, in practice, these powers are hitherto almost unapplied; partly because the magnitude of the evil is but most imperfectly appreciated, either by local authorities and justices, or by the slowly suffering artisans themselves; and perhaps still more—at least in regard of factories, for another reason. In any proceedings under the Nuisances Removal Acts, an official complainant should be ready to state in precise terms what remedy he asks the justices to apply. Now, in order to prescribe suitable ventilation for a work-place, there must be

\* See definition of nuisance in Section 8 of the Act 18 & 19 Vict. c. 121.—J.S.

† See Section 2 of the just recited Act.—J.S.

‡ See 23 & 24 Vict. c. 77. § 13.—J.S.

used a fair amount of intelligence and discrimination. The fittest means of cure are often not obvious to an unskilled person, nor uniform for all cases; and with ill-adapted ventilation there may be as much immediate annoyance as with non-ventilation. An average inspector of nuisances cannot dictate ventilation off hand, as he would direct the clearance of a dust-bin. Justices, acting without skilled advice, cannot themselves order in detail particular means of ventilation; nor could they reasonably order in general terms "that ventilation be provided to the satisfaction of the local authority," unless evidently this authority were acting with skilled advice. Thus, it seems, the evil is left unabated, lest perhaps any offered remedy should be worse than it;—much of the evidence painfully showing, that, where sometimes good intentions have been at work, they have commonly frustrated themselves through want of knowledge,—that, again and again, where a work-place has had inlets advisedly made for ventilation, these have been made with so little judgment that the work-people could not suffer them to continue.

Against the other sources of industrial disease to which the report has referred, no law yet pretends to make provision.

Thus, almost without exception, the sanitary circumstances of labour are left to take their chance of such improvement as the employer may be willing to offer, or the employed be able to exact. How partial, how imperfect, are the improvements thus realized, the submitted evidence abundantly shows. And how ineffectual they are to prevent the wasteful consumption of life, is shown by those sad statistics from which the investigation commenced.

(vi.) Practically, it seems certain that an indefinitely long time must elapse before better results can be brought about by the agencies which are now in operation; and that, year after year, as far forward as any present judgment would willingly speculate, the same terrible waste of adult life must, with no great mitigation, continue, unless the Legislature see fit to provide, by special enactment, for more wholesome conditions of labour.

No present  
prospect of  
much im-  
provement.



The suggestions, which, in this point of view, I would beg leave to submit for consideration are the three following:—

Questions which the evidence suggests with regard to amendatory legislation.

First,—industrial establishments, in their relation to the convenience and health of persons in whose neighbourhood they stand, are already subject to the Nuisances Removal Act. If it be duly certified that nuisance is caused by effluvia from “any manufactory, building, or place used for any trade, “business, process, or manufacture,” and that the person by or in whose behalf the work is carried on has “not used the “best practicable means for abating such nuisance, or preventing or counteracting such effluvia,” the local Justices, moved either by the local authority under the Act, or by any inhabitant of the place, may enforce a penalty which increases with each successive conviction:—but subject to these restrictions;—first, that Justices may suspend judgment, on condition that the person complained against undertakes to adopt, within reasonable time, such means as they judge practicable and order to be carried into effect for abating the nuisance; secondly, that the person complained against may appeal to Quarter Sessions, and this court may, if it see fit, cause the case to be removed for determination to the Court of Queen’s Bench; thirdly, that the penalty (which on a first offence is 40s. and increases with each subsequent offence) shall not in any case be increased beyond the sum of 200l. Is there any sufficient reason why industrial establishments, in their relation to the health of persons labouring in them, should not be made subject to the spirit of this enactment? It would indeed be unreasonable to expect unconditionally that a mine should be perfectly ventilated, or flax-hackling be perfectly without dust; but it would not be unreasonable to require, and it would seem quite indefensible to refuse, that, in these and like cases where masses of industrious life are jeopardised, the employer of labour should use *the best practicable means* to protect his labourer from harm.

Secondly,—certain industrial establishments are subject to Government inspection, and some, to a very limited extent, are regulated by Act of Parliament. Factories which have steam-engines or water-power, and also bleaching and dyeing works, are inspected in the interests of those who work in

them; so likewise are coal-mines and iron-mines. Is there any sufficient reason why these precedents should not be followed with other industrial establishments,—followed at least wherever there is proof that life is endangered by the occupation? There is cruel overwork\* of women and children in premises which have not the steam-engine or water-power qualification to be inspected. There is abundant causation of premature death in mines which are neither coal-mines nor iron-mines. And potters, grinders, carders, hacklers, not to mention hosts of other artisans, may, any of them, show the same claim as miners—the claim of grievous physical suffering—to have the special circumstances of their industry subjected to Government superintendence.

Thirdly,—in the above-cited cases, where Government inspection is made, the inspector, if he finds things wrongly or illegally done, sets in motion whatever means the special law under which he acts has provided for procuring correction or redress. Is there any sufficient reason why the inspector’s power of thus proceeding should not be extended to common sanitary faults in whatever work-place he inspects,—why, for instance, the factory-inspector should not be authorized to move Justices to order amendments of ventilation for a factory? The unboxed machinery, against which he now has authority to move the magistrate for penalties, is indeed a real danger to life and limb; but even though every mutilation which results from it were to be counted as a death, the deaths from unboxed machinery would prob-

\* In this report I have said little of over-work in itself; nor is any useful object to be gained by considering at present what might be a proper duration of daily labour if all the industrial circumstances were good. Those circumstances being what they are, “work” in the inspected occupations has almost universally been found to be “over-work”; and in some cases the duration of work has been such as, under the best conceivable industrial circumstances, would have been monstrous. Where any branch of industry is (either naturally or through adventitious circumstances) insalubrious, the injury to health of course increases with the extension of hours of labour; and accordingly, in proportion as any labour includes in itself special conditions against life, so, if life is to be cared for, the work-day of the particular occupation, as compared with the work-days of healthy occupations, ought to be of short duration. See also preceding footnote, p. 48.—J.S.

ably count as nothing in comparison with those which the unventilatedness of factories occasions. And a skilled inspector's intervention would supply the one condition which is hitherto absent, for getting the Nuisances Removal Act applied to the lessening of that gigantic evil.

In respectfully submitting these suggestions, I will venture to express my belief that if they were deemed fit for acceptance, and were practically carried into effect, the resulting gain would be among the very amplest which a Legislature can hope to realise through the application of preventive medicine. For the canker of industrial diseases gnaws at the very root of our national strength. The sufferers are not few or insignificant. They are the bread-winners for at least a third part of our population. Their struggle, at best, is not an easy one. That they have it made needlessly hard and painful for them, dignified while it is by their infinite patience and courage and mutual helpfulness,—that men and women, while at work for children and parents, have causes of disease indolently left to blight them amid their toil, and to drag them down from the independence which they cherish, is surely an intolerable wrong. And to be able to redress that wrong is perhaps among the greatest opportunities for good which human institutions can afford.

## 2. *Excessive Mortality of Infants in some Manufacturing Places.*

The remaining inquiry ordered by their Lordships during the year 1861—an inquiry into the sanitary circumstances of the infantine population in certain centres of industry, has grounds of interest almost identical with those of the last-mentioned inquiry.

In my report of 1858, practically an introduction to the annual reports which I have now the honour of submitting to the Privy Council, I drew attention to the fact that in different districts of England there are enormous differences of INFANTINE MORTALITY,—such differences that children in

Infantine  
mortality.

some districts die at perhaps four or five times the rate of children in other districts; and I stated my belief that these wide differences of death-rate are “due to the varying prevalence of two local causes:—

“ first, to differences of degree in *common sanitary defects* of residence; some places abounding more than others “ in the foul air and foul water of undrained, unpaved, “ unscavenged, unwashed, unlighted, unventilated, localities “ and houses;—

“ and secondly, to *occupational differences* among the “ inhabitants; there being certain large towns where women “ are greatly engaged in branches of industry away from “ home; where, consequently, the home is ill kept; where “ the children are little looked after; and where infants “ who should be at the breast are improperly fed or starved, “ or have their cries of hunger and distress quieted by those “ various fatal opiates which are in such request at the “ centres of our manufacturing industry.”\*

The inquiry now reported on was especially intended to throw light on the second of the just-mentioned influences. Dr. Greenhow, whom under their Lordships' orders I instructed to make it, combined with his inquiry into industrial diseases at Coventry, Nottingham, Blackburn, Birmingham, Wolverhampton, Merthyr Tydfil, and Abergavenny, an inquiry into the circumstances of infant life in the same places respectively. His report is subjoined. It gives a very sad picture of suffering and demoralization, caused by the present circumstances of female employment in factories. It corroborates very exactly the opinion above expressed as to the probable causes of the high mortality of infants in places of female factory occupation. And it shows that while the infants perish under the neglect and mismanagement which their mothers' occupation implies, the mothers become to a grievous extent denaturalised towards their offspring.

\* See the above reprinted “ Papers relating to the Sanitary State of the People of England,” Vol. I., p. 469.—J.S.



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The following quotations tell the main facts of the case :—  
 “ Factory women\* soon return to labour after their confinement. The longest time mentioned as the average period of their absence from work in consequence of child-bearing was five or six weeks; many women amongst the highest class of operatives in Birmingham acknowledged to having generally returned to work at the expiration of a month; and it was stated by several medical men of great experience, and by other witnesses in Coventry and Blackburn, that the factory women even sometimes return to work as early as eight or ten days or a fortnight after their confinement. . . . Mothers employed in factories are, save during the dinner-hour, absent from home all day long, and the care of their infants during their absence is entrusted either to young children, to hired nurse-girls, sometimes not more than eight or ten years of age, or perhaps more commonly to elderly women, who eke out a livelihood by taking infants to nurse. Young girls, aged seven or eight years, are frequently removed from school for the purpose of taking charge of younger children while the mother is absent at work, and are sometimes said to return, on the death of the child, evidently rather pleased that this event has released them from their toil. . . . Children left by their mothers during so great a

\* “ The contrast between the treatment of infants by their mothers in Merthyr Tydfil and Abergavenny and in the factory towns was most remarkable. The mortality among young children in these Welsh districts is said by the local medical practitioners to be much augmented by mismanagement, more especially by exposure to inclement weather and by improper feeding; but these habits proceed from ignorance, and not from neglect, the mothers, for the most part, being devotedly attached to their offspring. The houses are kept very hot within doors by means of large fires, and the mothers are accustomed to carry their children about with them wherever they go. Even children suffering from bronchitis, which is very prevalent in this bleak region, are habitually carried from the hot air within the house into the cold external atmosphere, whenever the mother has occasion to go out of doors. Another cause of infantile illness, and especially of convulsions, which occasions a large mortality in some of the Welsh districts, was said to be the custom of covering infants entirely over when laid in a cradle or bed. The air breathed by the infant while asleep is on this account imperfectly changed, and this may perhaps be one cause of the great prevalence of nervous diseases among the children of these districts.”—J.S.

“ part of the day are fed in their absence on artificial food, Infantine mortality.  
 “ which is for the most part unsuited to their digestive powers. The children are thus almost entirely spoon-fed, the mother being able to nurse them only at night, perhaps hastily early in the morning before setting out for the mill, again at dinner-time, and no more until evening. . . . Pap, made of bread and water, and sweetened with sugar or treacle, is the sort of nourishment usually given during the mother's absence, even to infants of a very tender age, and in several instances, little children, not more than 6 or 7 years old, were seen preparing and feeding babies with this food, which in such cases consisted only of lumps of bread floating in sweetened water. . . . Illness is the natural consequence of this unnatural mode of feeding infants. . . . Children who are healthy at birth rapidly dwindle under this system of mismanagement, fall into bad health, and become uneasy, restless, and fractious. To remedy the illness caused by mismanagement, various domestic medicines are administered, more particularly some kind of opiate, such as Godfrey's cordial, or laudanum. Wine, gin, peppermint, and other stimulants are likewise often given, for the purpose, as alleged, of relieving flatulence, their actual effect being, however, rather to stupify the child. The quantity of opiates sold for the purpose of being administered to infants in some of the manufacturing towns is very large. . . . Women when remonstrated with on the subject of drugging their children with laudanum, say that they must keep their infants quiet, as their husbands and elder children, who have to work during the day, cannot do so if disturbed at night. Besides that sold by regular druggists, much opiate is also sold in most manufacturing towns by grocers and small shopkeepers, and a considerable quantity by druggists under other names, such as ‘ Infants' Bottle,’ &c. Indeed there seems to be no doubt that the habitual administering of opiates to infants must be included among the causes of a high infantile mortality in certain manufacturing towns not only on account of an over-dose being occasionally given, but also because infants kept in a state of continual narcotism will be thereby

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" rendered disinclined for food, and be but imperfectly  
 " nourished. . . . Parents who thus entrust the management  
 " of their infants so largely to strangers become more or less  
 " careless and indifferent about them, and as many of these  
 " children die the mothers become familiarised with the fact,  
 " and speak of the deaths of their children with a degree of  
 " nonchalance rarely met with among women who devote  
 " themselves mainly to the care of their offspring. Without  
 " entirely concurring in the opinion expressed by several  
 " persons in Nottingham, that child murder is common in that  
 " town, it may yet be affirmed without hesitation, from the  
 " facts brought to light during this inquiry, that a greater  
 " degree of indifference is manifested towards their children  
 " by the female operatives of manufacturing towns than is  
 " found to be the case elsewhere. . . . Abundant proof of the  
 " large mortality among the children of female factory opera-  
 " tives was obtained during the inquiry. An operative of  
 " the better class in Birmingham reported that he collects  
 " money for the expenses attendant on the deaths of children  
 " among the workers in a factory where 150 women are  
 " employed, and that he believed 10 out of every 12 children  
 " born to the married women in this factory die within a  
 " few months after birth. Many married women were  
 " questioned, as opportunity served, in the several factories  
 " visited, regarding their families, the number of children  
 " they had borne, the number that survived, and the manner  
 " in which they were brought up. The evidence of these  
 " women tallied exactly with that of other persons. . . . It  
 " was frequently found that two-thirds or three-fourths of  
 " the children born to these women had died in infancy."

It is scarcely necessary to observe, that against this state of things, there is no resource in any present provisions of law. And the root of the evil is an influence with which English law has never professed to deal. Money is on one side; penury on the other. Domestic obligation is outbidden in the labour-market; and the poor factory-woman, who meant only to sell that honest industry of hers, gradually finds that she has sold almost every thing which other women understand as happiness. But the root of this evil is perhaps

out of reach of law—certainly out of reach of remedies which I am competent to advise. And I will only suggest, with reference to one part of the consequences, that factory-masters who employ adult female labour would do something to mitigate the sufferings and demoralization which result from it, if they would establish within their factories, under well-advised regulations, nursery-rooms, where working mothers might leave their infants in some proper and kindly charge, and might, as often as necessary, have access to them.

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### *New Mortuary Returns.*

With reference to the matters discussed in the present and last preceding sections of my Report, I have not on this occasion adduced any precise statistical evidence. Statistics, generally justifying the assertions I have made, are given in my former reports, especially in the above-mentioned *Papers relating to the Sanitary State of the People of England*. But I am glad to say that very shortly those statistics will not be the most recent which can be adduced. Eighteen months ago, with their Lordships' authority, I brought under the consideration of the Registrar-General that very great help would be given to the progress of sanitary investigation if he, having regard to the then approaching new census of the population, and to the facilities which it would afford for the calculation of accurate death-rates, would cause to be prepared a *digest of all the mortuary returns relating to the intercensal period 1851–1861*, with such distinctions of age and sex, and such classification of *causes of death*, as would enable the student to estimate, at least with approximate precision, how far each district of England is affected by the several chief sorts of morbid influence. The Registrar-General, with his invariable willingness to assist inquiries of this description, resolved to make the suggested compilation. I have reason to believe that it is now in an advanced stage of preparation, and will at no distant period be completed. Ample means will then exist, and be universally accessible, for measuring the amount of mortal injury which different local influences inflict on different sections of our population.

Statistics for the exhibition of special morbid influences.

In relation to this important object, and in relation to those local inquiries which it is their Lordships' function to make, the value of the promised compilation will be such as to mark a new era for sanitary studies in England.

**From the Fifth Report to the Privy Council, 1862.**

[The Fifth Report comprises a section relating to Public Vaccination which has already appeared in Vol. I., pp. 356-61; a section on the Distribution of Disease in England, relating to Industrial Diseases:—(1.) Occupations which have to do with Arsenical Green, (2.) Occupations which have to do with Phosphorus; a section on the Cotton Famine; a section on the Diseases of Live Stock in their relation to Meat and Milk Supply.—Ed.]

**DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED—cont.**

*Industrial Diseases.*

Of the inquiries made during 1862 into OCCUPATIONS WHICH ENDANGER HEALTH, two were completed. Reports relating to them,—viz., a report by Dr. Guy on the manufacture and applications of *arsenical green*, and a report by Dr. Bristowe on the manufacture and applications of *phosphorus* are appended [A].

**1. The Occupations which have to do with Arsenical Green.\***

Work-people who have much to do with arsenical green are liable to suffer from its influence in two different ways;—

\* In connexion with the present inquiry, notice has necessarily been taken of the eventual uses which are made of arsenical green, and of the effect which some of these uses may have upon the public health. Although every one knows that the so-called "emerald green" is an admirable pigment, not every one knows and remembers that "emerald green" is a virulently-poisonous compound of arsenic. And hence it comes that the pigment is extensively employed in ways which are utterly improper in the case of so dangerous an article. Materials coloured by it are seen in many directions where the public, if duly informed, could scarcely consent to tolerate the danger;—not only on a comparatively small scale in the lining of boxes, the painting of children's toys, the wrapping and ornamentation of confectionery—if not even the confectionery itself, but also, and copiously, in the paper-hangings of rooms, and in the wreaths and tarlatanes of ball-dresses. Dr. Guy's report contains illustrations of the mischief which every now and then arises from one or other of these objectionable uses of the pigment.—J.S.

Industrial Diseases.

Working with Arsenic.

first, almost universally they suffer, and in many cases very grievously, from peculiar skin-affections which the irritating arsenical dust of the occupation engenders;—secondly, in many cases, the arsenic gets absorbed into the body, and produces with more or less severity the ordinary signs of chronic arsenical poisoning. These results do not fall with equal severity on all branches of the industry, nor on all industrial establishments, but, both in different branches of occupation and also in different establishments, proportion themselves to the intensity of the arsenical influence. It accordingly deserves particular notice that the occupations which have to do with arsenical green are pursued entirely without restriction by law. And the evidence now submitted with regard to these occupations corroborates, I think, very importantly the general conclusion which an accumulation of other evidence led me to suggest in my last annual report,—that all industrial establishments which directly or indirectly endanger health ought to be subject to official superintendence and regulation.

Sufferings from arsenical green arise much more during the applications, than during the manufacture and packing, of the pigment. Indeed the *manufacture*, if done in the open air, does not seem to produce extreme ill-consequences. The arsenical dust, like all dusts, irritates the mucous membrane of the nose and eyes: presently it begins to affect the skin (especially at the nostrils, at the bend of the arms, at the armpits, and at the scrotum) producing itching, blotches, rawness, and perhaps boils; and these inconveniences, it seems, commonly make the workman discontinue work before he has absorbed such a quantity of arsenic as would affect his internal organs and develop signs of true arsenical poisoning.

The *industrial applications* of the pigment are principally two:—first, in the colouring of various papers either of the sorts used for ornamental wrapping and lining, or of the sorts used for hanging in rooms;—secondly, in the colouring of artificial leaves, fruits and flowers. The pigment is also used, though less considerably, by chromolithographers and toy-makers. It is likewise used by house-painters. It is used as a colour for tarlatanes. And most culpably, though only to a small extent, it is used by the makers of cake-ornaments

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Working  
with Arsenic.

and coloured confectionery. So far as concerns the health of persons employed, only the first two occupations require particular notice:—but, in them, there is very considerable suffering.

Thus, for instance, in visiting one of the larger establishments where artificial leaves are made—an establishment employing about 100 young women, Dr. Guy found that more or less suffering was almost universal among the work-people. The skin-affection, which hardly any of them escaped, and which sometimes would begin after even so little as one day's working, occurred in different degrees;—sometimes as mere erythema, sometimes as an eruption of clustered papules, vesicles, or pustules, sometimes as more or less destruction of skin by process of ulceration or sloughing. The fingers, which (often with accidental chops and scratches on them) are the immediate agents in the industry; the face; the neck, especially about the roots of the hair; the flexure of the arms; the axilla; the genitals;—these were the parts where the skin-disease had most shown itself,—parts, namely, to which the arsenical dust is most largely applied, and parts where it is likeliest to be retained, and parts where the cuticle is most thin and penetrable. The suffering from these skin-affections had been in many cases very considerable;—for instance, in several cases the mere pudendal affection had been such that the sufferers could not bear to sit down. But the skin-affection was only a minor part of the suffering. Of 25 of the sufferers whom Dr. Guy examined, nearly all showed signs, often highly developed, of chronic arsenical poisoning;—excessive thirst; nausea and loss of appetite; sickness and vomiting, often with pain in the stomach; palpitation and shortness of breath; debility, fever, headache, drowsiness, dimness of sight, and tremblings, nervous twitchings or convulsions:—“Of the whole group of 25 females (says Dr. Guy) “four only did not complain of weakness; and of the remaining 21, there were again only four who did not describe the weakness as extreme. Febrile symptoms were present in no less than 20 cases, in five of which they amounted to feverishness, while in the remainder they were described as fever. Headache, again, was an almost universal symptom.

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“It was absent in two cases only, and was described as not severe in only three cases. Dimness of sight was complained of in two-thirds of the cases. In one the eyes were very sore, in another the sight was greatly impaired. Drowsiness was present as a marked symptom in every instance but one, and in two cases only was it spoken of as a trivial circumstance. Tremblings and convulsive twitchings were present in seven cases out of the 25, and in one other instance well-marked convulsions were present.” It is wonderful that, out of such a group as this, deaths are not constantly occurring in a way to demand the coroner's investigation. But whatever may be the explanation of the fact, only one such investigation seems to have been made. The death which gave rise to it (and which occurred towards the end of the year 1861) was certified by the coroner's jury to be “Death by Arsenite of Copper.” The victim—a girl of 19, whose case is told by Dr. Guy, had for 18 months without intermission, in spite of cruel sufferings, pursued her poisonous occupation. Her story during nearly all this time was but the common story of the workshop,—only the same sort of story as Dr. Guy elicited from many of those whom he examined. During the whole time she had “suffered from eruptions about the neck, scalp, and hands, accompanied by pains in the nose, with the common symptoms of a cold, great pain in the left side, frequent vomiting of food, and intense thirst. She was first seen by Mr. Paul [the medical man who attended her] on the 15th of November. She was in bed, breathing laboriously, and complaining chiefly of the pain in the side and frightful thirst. The countenance wore an expression of great anxiety, and the conjunctiva had a peculiar green tint. The pulse was about 120, and very small. The tongue was dry, brown down the centre, and green on each side. The vomited matter was quite green, but the discharges from the bowels had a natural colour. There was little diarrhoea. The skin was very hot. The abdominal parietes were drawn back, but the abdomen was not painful, except just over the stomach. There was a slight cough, but no expectoration. On the following day she still complained of pain and thirst, and her pulse

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" was 130. At the evening visit the breathing had become much more laborious, and the pupils were dilated. On the 17th the pulse was of the same character, but increased in frequency. The vomiting continued till the evening, when she still complained of the pain, which was worse. On the 18th she was found in the same state, but on the 19th she was seen to be sinking fast. She had twitchings of the left side of the mouth, and was scarcely able to speak, but she said that everything she looked at was green. The pulse had risen to 140. During the night of November 20 she became insensible, and died at 11 a.m."

The tortures which that poor girl must have endured will not have been in vain, if, as may be hoped, the public knowledge of them leads to the amendment of a system under which others are still day by day enduring in different proportions the progress of a similar fate.

The restrictions under which this injurious, and perhaps not indispensable, branch of industry ought alone to be carried on are, in my opinion, as follows:—first, as a cardinal rule (the enforcement of which would make it an interest of each establishment to enforce various improvements of detail) the employment of any person while presenting even in the slightest degree any sign of general arsenical poisoning should be absolutely prohibited;\*—secondly, by scrupulous cleanliness of the workplace and workers, by ventilation of the workplace, and where necessary by special apparatus, the best known means should be used to prevent the diffusion of arsenical dust in the common atmosphere of the workplace, and to reduce the worker's liability to receive the dust upon his hands.†

\* The observations which in my last annual report (p. 48 foot note) I made on the injurious effects of extreme subdivision of labour are applicable to the present subject. Working with an arsenical pigment might not cause any appreciable injury to health, if it formed only a small part of the worker's total occupation. A manufacturer, properly organizing his business, ought of course to secure this result; and the rule which I have suggested in the text would perhaps be the readiest mode of bespeaking his exertions to secure it.—J.S.

† The dangers to which the general public is exposed by the various ulterior uses of emerald green (see former foot note at p. 60) cannot, for the most part, be adequately guarded against except by better public knowledge on the subject. It would be desirable, however, that the uses of emerald green by confectioners,

## 2. *The Occupations which have to do with Phosphorus.*

The utilisation of phosphorus in various popular contrivances for producing instantaneous light has, for the last 30 years, been a special industry. And with the growth of this industry, a new disease has come into existence. About 18 years ago observations began to be published to the effect that, of the workpeople who in the new industry were exposed to the vapours of phosphorus, some, but apparently not a large proportion, suffered in consequence of the exposure a peculiar disease of the jaw-bones; namely,—that, after a variable premonitory period of such moderate local irritation as might be supposed to be mere common toothache or gumboil, evidences of destructive bone-disease— affecting commonly at first only a small portion of bone, but perhaps eventually invading all or nearly all of the lower or of the upper jaw, would become manifest,—that in average cases of this very painful and very loathsome disease, recovery was not got except after sufferings which could scarcely be of less than many months', and often were of some years', duration,—that in severe cases the patient was likely to sink under the pain and exhaustive discharges of the disease, and that at best he would be left deformed and mutilated. Almost as soon as the disease was recognised, investigations were made into the details of its pathology. And these investigations seemed to establish as certain, that the disease is in its origin purely local,—that it depends on an influence which the fumes of phosphoric acid, when they get dissolved in the saliva, are able to exert directly and specially within the mouth.\*

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either for confectionery itself, or for any wrapping or ornament of confectionery, should be punishable by summary proceeding. And it would also be desirable that the sale of emerald green and of objects coloured with it should be subject either (*mutatis mutandis*) to the same rules as govern the sale of white arsenic, or at least to such rules as would ensure the purchaser's being fully informed that the commodity which he purchases is poisonous.—J.S.

\* Von Bibra, the most important among the original writers on the disease, believed, both from inquiries which he made of work-people, and from experiments which he performed on rabbits, that the phosphorus fumes could not act hurtfully on the jaw if the teeth and gums were in a normal state; and from his teaching it has been commonly believed that a carious state of teeth (as allowing



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From the inquiry which has now been made under their Lordships' direction into the circumstances of the phosphorus-industry in England, it appears (as had been anticipated) that the jaw-disease which I have described is not of frequent occurrence. Dr. Bristowe, after visiting all the known match-making establishments in England—57 establishments, employing about 2,500 hands, has not been authentically informed of more than 59 cases (past or present) of jaw-disease. And though doubtless in some instances information has been withheld from him by manufacturers who feel that their experience has not been creditable to them,—so that the total production of jaw-disease during the last 30 years has been greater, perhaps considerably greater, than these numbers express,—yet very probably there would be no understatement of the truth in applying these numbers to the *present time*, and in assuming that now (with the improved arrangements which a less favourable early experience has induced all respectable manufacturers to adopt) not more than two or three cases of the jaw-disease are annually produced in England. Almost certainly, however, these few cases occur under circumstances which the manufacturer ought not to let exist, and which—if dangerous occupations were subject to official superintendence, would of course be forbidden to continue. For, as Dr. Bristowe observes, “while it is the easiest thing in the world for a factory to be made a hot-bed of disease, it is little less easy, by adopting precautions of the simplest and most obvious description, to render the occurrence of jaw-disease therein a rare and quite exceptional occurrence.”

Those precautions of the “simplest and most obvious description,” to which Dr. Bristowe refers as essential for the phosphorus-worker's safety, and respecting which he gives in his report all needful particulars, are, in principle, two:—first, that the organization of the establishment shall

the acrid influence of the phosphorus-fumes to soak more easily to the deeper textures of the jaw) is the great predisposing circumstance against which precautions ought to be taken. From statements made in Dr. Bristowe's report it seems that Von Bibra's conclusion ought not, without further inquiry, to be taken as absolutely established, and Dr. Bristowe has therefore been instructed to seek for proofs which may be conclusive on the subject.—J.S.

be such as not at any time to expose to phosphorus-fumes more workers than must necessarily be exposed to them,\* and such as to restrict this necessary exposure within the narrowest possible limits of time and intensity; secondly, that the establishment shall have suitable ventilation—including of course special ventilating-arrangements for those processes of the manufacture which cause the greatest evolution of fumes. That precautions to the above effect are entirely effective for their purpose, is shown by many passages in Dr. Bristowe's report,—passages which contrast the experience of well-conducted establishments with the experience of ill-conducted establishments, and justify me in referring exclusively to ill-conducted establishments the production of all jaw-disease which there has been. One such passage, which contrasts the experiences of a single establishment at two different times of its working, is so suggestive that I quote it here in Dr. Bristowe's words:—“By far the most remarkable and instructive experience of the disease, however, is that afforded by a congreve-manufactory in Manchester, which is one of the largest in England, and in which 250 persons, exclusive of box-makers and splint-cutters, are constantly employed in the various processes of match-making. This factory has been in existence for about 25 years, and during the first 20 years of its operations, no less than 24 cases of jaw-disease occurred. The jaw-disease too, in this case, was not limited, as in most other factories, to the dippers and mixers, and consequently to adults; but the boxers, the cross-cutters, and the pickers out, formed a large proportion of those affected; and children, from 12 to 15 years of age, suffered as well as their elders. The explanation, however, is easy, and was pointed out to me with great candour by one of the proprietors. The fact is, that all those various conditions, which tend to the production of the disease, were here concentrated and combined; and all the operatives became nearly equally exposed to the fumes of phosphorus. A very large

\* Whether these must always be the same persons is a question which I think deserves consideration. See preceding foot notes, pp. 48 and 64.—J.S.

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" number of workpeople was employed. They were confined  
" in low, ill-ventilated, over-crowded rooms. The dipping,  
" the drying, the boxing, &c. were all carried on in the same  
" apartment. Bundle-dips formed a large proportion of the  
" matches which were manufactured; and the composition  
" employed contained one-third by weight of phosphorus.  
" Further, at one period (and about that time the disease  
" was most prevalent) the operatives worked far into  
" the night, as well as by day. About five years ago,  
" the proprietors, who had been much concerned by the  
" frequent occurrence of the disease, set to work seriously to  
" remedy the defects on which they believed it to depend.  
" They constructed large, airy, well-ventilated rooms, they  
" gave up the manufacture of bundle dips, and they diminished  
" by one-half the strength of their composition. The result  
" has been, that not a single case of the disease has originated  
" in this factory, during the five years that have elapsed,  
" since the above improvements were effected."

The dangers to which I have adverted as belonging to the phosphorus-industry belong exclusively to working with *common* phosphorus. Working with *amorphous* phosphorus is unattended with danger to health. Since, however, it appears that, with reasonable precautions, the use of common phosphorus for match-making needs not be an unwholesome occupation, I cannot say that, in my opinion, the substitution of amorphous for common phosphorus in the manufacture is, for sanitary purposes, an object to be unconditionally insisted on. Yet having regard to the fact, that amorphous phosphorus not only is manufactured without danger to the worker, but that its use in lucifer-boxes (according to the patented plan of Messrs. Bryant and May) also involves infinitely less danger of fire than belongs to common lucifer boxes,—I think that the substitution is altogether one to be desired. And of course, with reference to any restriction which the Legislature might think of imposing on the utilisation of common phosphorus, it would deserve to be remembered that manufacturers would have at their option the alternative of using without restriction the innocuous amorphous material. As regards the admissibility of this

material, I beg to refer to the statements thereupon which Dr. Bristowe quotes from three principal firms of match-makers.

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Before closing the present section of my report, I must specially mention that, in both the industries reported on, young people, from childhood upward, are employed in uncertain proportion. If the occupations are to be so regulated as no longer to include special causes of unhealthiness, the question whether young persons shall work in them will only be part of the more general question (on which I need not now dwell) whether the employment of young persons, as such, should be the subject of particular restrictions. But if the occupations—and especially the first mentioned of them, are to continue unregulated, it will certainly deserve particular consideration that, among the persons exposed to injury, are persons whom the law of this country supposes incapable of properly defending their own interests.

The employ-  
ment of young  
persons in un-  
healthy occu-  
pations.

#### THE COTTON FAMINE.

In the month of October last there was room for very great anxiety as to the sanitary prospects of the cotton-districts of England.

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The staple industry of those densely-peopled districts—the industry which previously gave livelihood, direct or indirect, to two millions of population, had for some months been declining, and was now probably at not more than a sixth part of its usual activity. Wide-spread bitter poverty was of course the result.

And this poverty was in strong contrast with former circumstances. The affected class was not a common low-typed proletariat, familiar with parish doles, and preferring pauperism to labour. On the contrary, it was a people long accustomed to prosper on the fruits of its own labour; a people having among it a good deal of mental culture and some great moral qualities; a people legitimately proud of its old self-supporting

power and independence. Borne down of late by the increasing stress of a poverty which was quickly tending to become absolute privation, the sufferers had not clamored as to their growing need for help. Even to the last they had rather shrunk from disclosing it. Swarms of them had long been hungering in silence. As wages had begun to fail, first, in many cases, there were previous well-earned savings to be exhausted; then, in nearly all cases, there was household furniture and bedding, or at least clothing, which might be pawned or sold. Gradually during the summer these resources had been drawn upon; but doubtless very reluctantly, not at the first partial failure of wages, not till hunger became urgent, not a bit more than hunger must have its way.

And now, in October, a crisis in this long contest was at hand. Besides the pauperism which was known, there was an unascertainable, but enormous, amount of impending destitution. The ill-nourished were in myriads. Machinery, local or national, for giving relief to the distressed populations, such machinery as afterwards became most efficient, was hitherto but imperfectly organized. There was imminent danger that death on a large scale might result directly or indirectly from starvation.

Foremost there was the unwonted possibility that England might have to endure, almost without power of arresting if begun, the terrible spectacle of a famine fever. For the circumstances under which true TYPHUS—the “gaol-fever,” the “camp fever,” the “ship-fever,” of our ancestors, can do its worst as a national epidemic, are provided for it by extreme poverty and destitution. The disease is never otherwise than contagious, and its contagion spreads like wild-fire among any half-famished population. Sixteen years ago, Ireland had had this most dreadful of sanitary experiences. And now, in October, there were rumours and, as afterwards appeared, well-founded rumours, that typhus had begun in our cotton-districts. There was the knowledge, too, that wherever typhus might show itself in those districts, hunger would not be the only baneful influence in favour of its spread. Eminently contagious as it is by means of exhalations from the sick, and only partly divestable of that property by even the

best ventilation of the best hospitals in Europe, it must of absolute necessity spread wherever persons who have not previously suffered its attack encounter its intense contagium in over-crowded, ill-ventilated dwellings. And this danger had to be apprehended in the cotton-districts. For means of rent-paying had ceased. Partly in consequence of eviction from former lodgings, partly in voluntary search for the cheapest obtainable shelter, the population had been gradually getting more and more restricted in dwelling-space. As colder weather began, as the want of fire began to be felt, as the absent clothing and bedding began to be missed, so, more and more, for warmth's sake, the dwelling-spaces were sure to be without ventilation, and the inmates to be huddled together. Within the atmosphere of any such dwelling-places, the spark of typhus-contagion, if it should enter, would find every opportunity to spread.

Under these circumstances, my Lords had to watch carefully all fluctuations of health in the distressed districts, and to satisfy themselves that due local precautions were being taken to prevent the destitution which breeds disease. With this view their Lordships determined to have for the rest of the year a medical inspector constantly in the suffering districts, from whom every day they might receive information, or through whom give advice, concerning these very important matters; and the gentleman, whose services I under their Lordships' directions engaged for the purpose, was Dr. Buchanan, one of the physicians to the London Fever Hospital.

As I append [A] the summary report which Dr. Buchanan made when his inspection was drawing to an end, I have only to describe in general terms the duty which he performed. His attention was of course primarily directed to those towns where true typhus prevailed or was rumoured to prevail. His first and longest visit was therefore paid to Preston, and afterwards inquiry was made into the alleged existence of fever in Ashton, Blackburn, Chorley, Darwen, Manchester and Salford, Stockport and Wigan. More recently Accrington, Bacup and Bolton were visited with the same object. At Ashton, Stockport and Wigan, no remarkable excess of



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fever was found; at Darwen, Bacup, and Bolton fever was found with unusual prevalence, but the fever was typhoid, not typhus; at Blackburn, Chorley, and Salford there appeared to have been scattered cases of true typhus; at Accrington\* and Manchester such cases were in larger numbers; and in Preston the epidemic was considerable.†

In all the towns enumerated, as also in Bury and Oldham, inquiry was made into the general sanitary circumstances of the poor, and especially of the unemployed cotton operatives. So far as was needful for their Lordships' purpose, Dr. Buchanan communicated with the different local authorities and their officers, and conveyed their Lordships' suggestions as to the means that appeared most desirable for preventing the outbreak or checking the progress of disease. Especially he drew attention to cases where the allowances made to the unemployed population were not enough to maintain health, to cases where clothing and bedding were deficient, and to cases where overcrowding and uncleanness were tending to multiply infectious disease. In these and like cases he discussed in detail with local authorities and their officers the remedial means which in the particular town were most applicable. Also, in order to guard against contagious fever spreading in those towns where it had appeared, he conveyed their Lordships' strongest recommendations that the sick should be removed, from their commonly overcrowded and

\* Accrington was not visited till January. It then appeared that 40 cases of true typhus had occurred since the middle of October. Among these there had been 9 deaths.—J.S.

† In all those towns where most typhus fever was seen, the disease attained its maximum of prevalence before December, and in that month there appeared a decline in its epidemic force. At Accrington and Manchester at the beginning of January the fever had so far ceased that for a fortnight scarcely a single new case had come under treatment in either town. In Manchester the monthly variations in the amount of typhus are best measured by the experience of the parochial fever hospital, where alone typhus patients are received in any number. Since Midsummer the admissions for this disease had been as follows:—In July, 7; in August, 8; in September, 12; in October, 20; in November, 25; in December, 17; and in January, 16, all in the latter part of the month. Besides these there were cases treated at the infirmary and at their own houses. At Preston the attacks of typhus (as reported by the public medical practitioners to the Local Board of Health) were as follows from month to month. In July, the new cases numbered 2; in August, 8; in September, 33; in October, 95; in November, 95; in December, only 42; and in January, 41.—J.S.

unwholesome homes, to hospitals. And where the hospital-  
accommodation of a town threatened to become inadequate, means for meeting any increased demand which might arise were suggested.\*

While getting intelligence with regard to the progress of the cotton famine, and of the measure taken for its relief, their Lordships found it expedient also to provide themselves with more exact scientific information than was at the moment available with regard to the minute economics of diet. What was the least outlay of money which would procure food enough for healthy life?—and what plan of outlay would purchase the largest amount of true nourishment?—these questions were constantly under discussion. Questioners were naturally solicitous for an almost fractional accuracy of answer, and special scientific investigation was needed to supply the material for answering. Accordingly, under their Lordships' orders, I requested Dr. Edward Smith to make all requisite inquiry for this purpose. And the result is a report which discusses very minutely the whole subject of dietaries for the poor [A].

It was a most satisfactory issue to the anxieties of 1862 that typhus did not become extensively prevalent in the cotton-districts, and that, so far as the facts are yet known, there was no other great local derangement of the public health.

Because the Registrar-General's detailed information as to district-mortality is not available till about 18 months after the expiration of the year to which it relates, I cannot speak with confidence as to the exact influence which the cotton-famine has exerted on the death-rates of the affected populations. But, meanwhile, I would venture to suggest that caution is necessary in interpreting one broad fact which the Registrar-General has made public. It is certain that in some of the cotton-districts, during the winter months, the total mortality

\* Preston was the only town in which, at the time of Dr. Buchanan's visit, further provision for fever patients was urgently required, and here the immediate construction of temporary fever wards was advised. Accordingly a wooden building adapted for 60 patients, on a plan agreed on by the Borough Surveyor and Dr. Buchanan, was erected in November.—J.S.

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was less than usual; but it does not therefore follow (as some commentators on the fact have apparently believed) that the health of the distressed operatives was substantially better than usual,—that the privations which their enforced idleness entailed on them were less hurtful than their factory-occupation of common times. No doubt, indeed, but that factory-occupation produces, on a very large scale, chronic ill-effects on health; but, till further evidence be given, it must not, I think, be assumed that an interruption of factory employment can rapidly make such a diminution in the death-rate of the operatives as shall outweigh the evidence of injury from considerable degrees of privation. Assuredly, such a conclusion cannot be based on any facts which have yet been published with regard to the matter in question. A smaller than ordinary number of deaths in particular cotton-districts during the past winter may have been only one of those common predictable fluctuations of mortality which go to furnish average local death-rates, and may, indeed, have been a higher mortality than the districts without the cotton-famine would have had. But where this was not the case, where the cotton-famine truly lessened the local mortality, the saving may not have been of adult life. It may have been exclusively of infants. For the closure of the factories withdrew perhaps the deadliest influence with which the infantine population of the cotton-districts has to contend,—the influence which (as was shown in my last report) is exerted against infant life by the industrial occupation and absence of mothers. And, having regard to the great importance of this change, I can well conceive that in some places the total number of deaths may have been notably smaller than usual, even though the adult mortality have been considerably heightened by the cotton-famine.

These considerations are not advanced as of mere speculative interest. In the uncertainty which at present must be felt as to the industrial prospects of the cotton-workers, and with reference to the possibility that another winter may have to be faced under circumstances like those of the last, it is, in my opinion, of great practical importance that the sanitary dangers of privation should not be at all underrated.

Obviously, as regards the past, it is matter of fact that evils which might well have been anticipated did not fall, or at least did not heavily fall, upon the distressed populations. And for this happy result thankfulness is due, partly to the noble and successful exertions which were made, both locally and nationally, to avert extreme destitution from the endangered masses of population, and partly to the almost singular mildness of the winter.

But so far as that winter's experience of the cotton-famine is to be deemed prospectively applicable, it will be essential to remember that of the two influences by which the famine was alleviated, only one was of human option;—that the other might, notwithstanding all hopes and wishes, have been absent;—that, if the temperature of last November had continued through December and January—still more, if the temperature of these two months had (as usual) been much below the temperature of the November, the sufferings of the population must have been far severer than they were, and typhus could not but have spread much more extensively than it did.

#### DISEASES OF LIVE-STOCK IN THEIR RELATION TO THE PUBLIC SUPPLIES OF MEAT AND MILK.

Allegations have during the last few years been abundantly made, and have with the progress of time become more and more definite, that the flesh of animals slaughtered while in a state of disease, and likewise the milk of diseased animals, are extensively sold for human consumption in the United Kingdom. And the substance of these allegations has been submitted to the Lords of the Council. In 1862 their Lordships ordered an inquiry to be made in this matter, and under their directions I requested Mr. John Gamgee, Principal and Professor in the Edinburgh New Veterinary College, to report on it. For their Lordships' purpose it was likewise desirable that inquiry should be made as to the circumstances under which the more important diseases of stock prevail in the

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United Kingdom, and particularly into the influence of importation and of home-trade in spreading the infection of such diseases. So Mr. Gamgee was instructed to report also on this matter. And he was further instructed to quote in his report any statements credibly made to him as to injurious effects resulting to man from the consumption of the flesh or milk of diseased animals. In order to collect all requisite information for his report, Mr. Gamgee was authorized to visit any principal markets and slaughter places in the United Kingdom, as well as any districts where he might believe that disease was particularly rife; and he was further authorized to visit certain parts of the Continent with which our stock-trade is most active, and whence it seemed most possible we might be receiving infectious importations of stock.

Under the above instructions Mr. Gamgee has recently made a report [A]. His evidence is, in substance, as follows;—that disease prevails very extensively in the United Kingdom among horned cattle, sheep and swine; that the diseased state of an animal not only does not commonly lead the owner to withhold it from being slaughtered for consumption as human food, but on the contrary in large classes of cases (especially where the disease is of an acute kind) leads him to take immediate measures with a view to this application of the diseased animal; and that consequently a very large proportion (Mr. Gamgee believes as much as a fifth part) of the common meat of the country—beef, veal, mutton, lamb, and pork, comes from animals which are considerably diseased.

The diseases which figure behind the scenes of our dead meat market are of course various. And although for the purposes of this report it is not necessary to enter upon much detail concerning them, yet, in order to discuss their probable effect on the quality of meat, the more important kinds of disease must be separately spoken of. And they are three;—viz.: first, *contagious fevers*;—secondly, the so-called *anthracic and anthracoid diseases*;—thirdly, *parasitic diseases*.

Of the *contagious fevers* of stock, two are now widely prevalent in the United Kingdom,—namely, the *pleuro-pneu-*

*monia or lung-fever* which is peculiar to horned cattle, and the *aphthous fever, foot-and-mouth disease*, which affects indifferently and in common horned cattle, sheep, and swine. Cattle diseases in relation to supply of Meat and Milk.

A third disease of the same class—the *small-pox* of sheep, perhaps of all murrains the most dreaded in this country, is not known to be now prevailing among our flocks; but, a few months ago, an outbreak of it in Wiltshire excited the greatest alarm; and it is a disease which may at any moment be spreading here. A fourth most important contagious fever of stock—the very fatal *typhoid fever or steppe-murrain* of Russian horned cattle, has happily been kept away from us for more than a century, partly by the exertions which are made in Russia to limit the disease to those provinces where it is endemic, partly by the strict precautions which are taken at the eastern frontiers of Prussia and Austria to prevent contagious importations;—and while this system continues in operation, the steppe-murrain is of little practical interest to us.

Of the so-called *anthracic and anthracoid* diseases of stock—diseases which German pathologists have generalised under the name of *milzbrand*, many prevail to a great extent in the United Kingdom, though for the most part as endemic diseases, localised in particular sections of the country. It is said to be an essential character of these diseases, that the blood of the diseased animal undergoes peculiar—in some respects putrefactive—changes; but commonly the disease involves an occurrence of local infiltrations and effusions of putrescent blood-ingredients or blood; and in many cases there also occur, either primarily or secondarily, gangrenous changes (erysipelatous or carbuncular) in some superficial solid texture of the body. Diseases of this class are further characterised by the fact that during their course the diseased body develops in itself a specific morbid poison which by inoculation can be made to spread the disease to other animals, including man. The diseases which Professor Gamgee counts under the present head are as follows:—the *splenic apoplexy* of horned cattle and sheep, the *braxy* of sheep, the *black quarter* of horned cattle and sheep, the *glossanthrax or tongue carbuncle* of (almost exclusively) horned cattle, the *forms of*

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*anthrax* which affect the mouth, pharynx, and neck in swine, the *apoplexy* of swine, and their so-called *blue-sickness* or *hog-cholera*, the *parturition-fever* of cows, the corresponding *heaving-pains* of ewes, the *navel-ill* of lambs, and the *red-water* of sheep.

Thirdly, there are the *parasitic* diseases of stock,—diseases which consist in the colonisation of the living animal's body by lower animal forms, larval or mature, subsisting at its expense. Such are the following diseases;—the so-called “measles,” of the pig, in which disease the *cysticercus cellulosæ* (larva of the *solium* tapeworm) is found more or less abundantly diffused through the muscular system, and perhaps in other parts, of the animal;—the analogous disease of horned cattle, due to the larva of the *t. mediocanellata*;—the various, chiefly visceral, diseases of stock which depend on larvæ of the *tenia marginata* and *t. echinococcus*;—the brain-disease, “gid” or “sturdy,” which is due to a larva, mostly of the *t. cœnurus*;—the rot of sheep, due to swarms of adult and oviparous fluke-worms (*distoma*) in the liver;—the lung-disease which, especially in calves and lambs, is produced by different kinds of *strongylus*;—the easily-overlooked, but highly important disease of swine, which consists in an infestation of their muscular system by the minute immature forms of the *trichina*.

It is for obvious reasons impossible, in the present state of knowledge, to state in detail what income of morbid product flows from each of the above-mentioned sources into the markets which supply us with food. But from Mr. Gamgee's report, together with such other information as he has given me, I gather that, so far as he can learn, the truth is about as follows:—that horned cattle affected with pleuro-pneumonia are, much oftener than not, slaughtered on account of the disease, and when slaughtered, are commonly (except their lungs) eaten; and this, even though the lung-disease have made such progress as notably to taint the carcass;—that animals affected with foot-and-mouth disease are not often slaughtered on account of it, but if slaughtered, are uniformly eaten;—that animals affected with anthracic and anthracoid diseases, especially swine and horned cattle

thus affected, are (except their gangrenous parts) very extensively eaten; that the presence of parasites in the flesh of an animal never influences the owner against selling it for food;—that carcasses, too obviously ill-conditioned for exposure in the butcher's shop, are abundantly sent to the sausage-makers, or sometimes pickled and dried;—that specially diseased organs will often, perhaps commonly, be thrown aside; but that some sausage-makers will utilize even the most diseased organs which can be furnished them;—that the principal alternative, on a large scale, to the above-described human consumption of diseased carcasses is, that, in connexion with some slaughtering establishments, swine (destined themselves presently to become human food) are habitually fed on the offal and scavenage of the shambles, and devour—often raw and with other abominable filth, such diseased organs as are below the sausage-maker's standard of usefulness.\*

This, in general terms, is Mr. Gamgee's report on the subject. Disgusting as are the reflections which it suggests, there is not in it, I think, anything intrinsically improbable. For obviously wherever there is dangerous disease among stock, the owner's commercial instinct will be to make whatever salvage he can; and while he must well know that selling dead stock for meat pays better than selling it for manure, the public has no sufficient safeguard against his yielding unreservedly to that motive. And if, while his stock is suffering with even the most loathsome of diseases, he thinks fit to have each animal as it sickens, or even as it gets moribund, slaughtered and dressed for the market, assuredly there will often not be any effectual obstacle to his carrying that wish into effect.

One doubt, however, may well be raised on the subject. A first popular impression would be, that, if things are as described, pestilences must be bearing witness to the fact. Is it possible—may be asked—that cattle, having all the foulness of fever in their blood, or having local sores and

\* Mr. Gamgee's description of the state to which the swine are brought by this diet raises the question whether for the purposes of this report, they might not themselves properly be classed with diseased animals.—J.S.

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in relation to  
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infiltrations that yield one of the deadliest of inoculable morbid poisons, or having their flesh thronged with larval parasites,—is it possible that such cattle can be converted into human food, and yet not only the immediate scandal of a general poisoning be escaped, but even something not unlike general impunity be the result? Though the affirmative answer to this question may at first sight seem strange, nevertheless it is, with some qualifications, the true one. And doubtless the impunity, such as it is,—but it perhaps is far less general than it appears,—results from the operation of well-known chemical and physiological laws. Our animal food before we take it has for the most part been exposed to so high a temperature that any parasites which had their home in it are killed, and that whatever albuminous morbid contagium it contained has been coagulated and made inert. Probably too, against small quantities of animal poisons—and against such as communicate small-pox and glanders, just as against the venom of the cobra and rattlesnake, the stomach has resources of its own;—for any such organic product entering the stomach is at once (as regards that mobile chemical constitution on which its efficiency depends) exposed to the strong disinfectant chemistry of digestion, and thus, within narrow limits of quantity, is likely to be rendered inert before it can soak into living texture. Both these influences may count for something, and the first-mentioned of them for almost everything, in explaining the fact (so far as it is a fact) that many sorts of diseased meat are eaten with impunity. On the other hand it must be remembered, that, in this theoretical explanation, the two protective influences do not cover the whole field of danger;—for, in the first place, not all meat which is eaten has been exposed throughout (nor in every instance even at all exposed) to a temperature sufficient to kill parasites, and coagulate albumen; in the second place, even complete coagulation of albumen may, for aught which we know to the contrary, leave some morbid poisons in operation; in the third place it may very well be, that, even where cooking can divest a meat of some original specific infectiveness, the meat may still not be susceptible of quite the same digestional changes

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as healthy meat, when eaten, undergoes. And thus the theoretical apprehension would be, that, with our alleged large consumption of variously-diseased meat, the impunity of consumers, though it were the rule, might be subject to considerable exceptions.

Accurate empirical knowledge in this matter is hitherto only beginning to be gathered, and will not yet warrant any general dogmatic statements as to the effects of diseased meat on human consumers. But for another purpose, as I shall proceed to illustrate, even that scanty knowledge is not insufficient. Supporting, so far as it goes, the theoretical arguments which I have just used as to the possible dangers of the practice in question, it will at least suffice to justify much public caution on the subject. And in this point of view it may be convenient to notice, under separate heads the evidence which now exists as to the injuriousness of each chief kind of diseased meat.

(a.) First, as regards meat which is *infested with parasites*,—we know with absolute certainty that this may become a source of human disease. Every tapeworm found existing in human bowels was once a cysticercus, or other hydatid, nested either in the living muscle or in some other living texture of an animal which is used for food. Tapeworm unfortunately is not a very rare human affection; though how it comes to pass that we, not very rarely, get to swallow alive those cystic brute-parasites which are larvæ of the intestinal tapeworm, is somewhat difficult to explain. A mouthful of fresh “measly” pork, eaten raw, would of course explain such an occurrence. But the cysticercus cannot outlive being cooked; and as the form of cured ham, bacon and sausage is the only form in which uncooked pork is even scantily an article of diet among us, it seems probable that cysticerci may outlive some or all of the processes by which meat is commonly cured, and may thus get swallowed alive by persons who eat uncooked sausage, ham, or bacon.

This however is not our only concern with the tænia order of brute-parasites. Dogs and other animals which get opportunities of eating the raw offal of slaughter-houses are constantly swallowing live larvæ which afterwards become



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mature tapeworms within them. The mature tapeworm, holding fast by its head to the mucous membrane of its host's intestine, sheds from its other end the successive egg-bearing joints which it develops there; and wherever the tapeworm-lodging animal passes, these fertile fragments get dropped in all directions with excrement, and lead of course to a wide and dangerous dispersion of eggs. Often the eggs must find their way into sources of drinking-water, or on to various low-growing vegetables or fruits which are apt to be consumed in an uncooked state by man; and if, with any such vehicle, man swallows a live tapeworm-egg, he immediately has the egg hatched within him, and now in his turn suffers from the larval form of the parasite. Fresh from its egg, the young sexless animal, which he has swallowed, burrows through the wall of his stomach or intestine, and, having thence migrated to some more or less distant part of his body, grows there, destructively, to its full larval development as a cystic entozoon;—perhaps to show itself one of the sporadic locally sterile cysticerci which are commonest in man's muscle, cellular membrane, eye and brain; or perhaps (and this oftenest in man's liver) to prove itself the pill-box hydatid or echinococcus, and to illustrate one of the most striking stories of so-called "alternate generation," by breeding almost unlimitedly from its own larval substance, as by buds, new cysts which repeat the form and inherit the fertility of their strange sexless parent.\*

\* It is in Iceland that the saddest experience exists as to the above-described "alternate generations" of the tapeworm. There the diseases which are due to the various stages of various kinds of tapeworm prevail to an enormous extent among both men and cattle. Dr. Arthur Leared (who has recently investigated this subject in Iceland, and has kindly permitted me to read the English manuscript of an essay which he has published in Icelandic on the result of his inquiry) says, on the authority of Dr. Hjaltelin, of Reykjavik, that a fifth part of the human mortality in Iceland is caused by hydatid disease. And how great is the influence which the dog exerts as an intermediary in propagating such disease cannot be better illustrated than by the fact of Dr. Leared's having suggested, as one of his two measures for preventing the human hydatid disease, that all the dogs of the island should be medically treated for tapeworm. "The evidence against the dog in this matter" (says Dr. Leared) "rests upon numerous experiments conducted under circumstances leaving no doubt that tapeworms were produced by feeding them on fresh [hydatid] bladders. The conditions necessary for the propagation of the worm are nowhere so complete as in Ice-

Tapeworms are not the only injurious parasites which man Cattle diseases  
may receive from the animals which he eats. Quite recently in relation to  
it has been discovered that a microscopical thread-worm, the supply of Meat  
so-called *trichina spiralis*, brings, perhaps not very rarely, and Milk.  
the muscular flesh of swine into a state in which a small quantity of it, eaten raw, will suffice to destroy life;—viz.,—that the sexless larval trichinae, which may be counted by hundreds in any small mass of the diseased muscle, will acquire their sexual development directly they reach alive the stomach of the muscle-eating animal; that, unlike the tapeworm (which commonly sends forth its eggs to hatch somewhere outside the body wherein it dwells) each trichina will breed swarms of young within the intestinal canal of its host; and that these innumerable young, migrating from the animal's intestinal canal to all parts of its muscular system,

"land. The farmers kill their own meat, and the offal, frequently containing  
"living [hydatid] bladders, is the food of the dogs. Abundance of mature  
"worms are thus produced. Again, the whole country is one vast pasture,  
"and dogs are universally employed in managing the sheep. These dogs shed  
"everywhere segments of tapeworms, the eggs from which are diffused by rain  
"and melted snow. . . . Each segment is filled with innumerable  
"eggs, invisible to the unassisted eye, which are not set free in the intestine of  
"the dog, but in the outer world, by the decay of the case containing them. It  
"is impossible to say to what extent these eggs preserve their vitality, but so  
"resistent is the outer shell, that I have found them, by examination with the  
"microscope, quite intact after having been steeped for twelve hours in strong  
"sulphuric acid. It seems that desiccation is most fatal to their vitality, and  
"there can be no doubt it is for this reason that sheep are much less liable to  
"staggers in dry seasons and on high grounds, than when the season is wet or  
"their feeding grounds are low and damp. . . . These eggs finding their  
"way into drinking water, or adhering to articles eaten raw, as bilberries or the  
"stalk of the *Angelica*, are swallowed by men. The hands are even liable to be  
"infected from contact with the grass, so that the eggs may easily be swallowed  
"with ordinary food, or from the casual application of the hand to the mouth."  
The plan on which Dr. Leared recommends that the dogs of Iceland should be treated is that they should all at one and the same time be dosed with *Kamala*, an Indian vegetable drug, which Dr. Leared describes to be a very efficient (as well as cheap and tasteless) remedy against tapeworm.

The scope of my report does not allow me to enter upon the history of the singularly interesting inquiries through which, during the last twenty years, the genesiology of parasitic worms has been gradually becoming clear to us. I would only venture to express my deep sense of the services which have been rendered to practical medicine, not less than to exact science, by the researches of Steenstrup, Van Beneden, Küchenmeister, Van Siebold, Stein, Leuckart, and others; and especially by those conclusive experimental investigations which are due to the example and suggestions of Küchenmeister.—J.S.

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will create an amount of irritation which often is sufficient to kill. This result has been witnessed, not only among various lower animals whereon the experiment has been abundantly tried, but also quite indisputably in man.\* And the danger to man is even greater than I have yet said. For pork, in order to be capable of carrying live trichina-larvæ into the stomach, needs not to be absolutely raw. Professor Leuckart, a distinguished experimenter on this subject, has found trichina-meat retaining much of its dangerous qualities even when it had to some considerable extent undergone both pickling and smoking.

(b.) As regards possible ill-effects from consuming, in a well-cooked state, the flesh of animals with *anthracic* or *anthracoid* disease, evidence is still imperfect;—partly, no doubt, because extreme ill-effects do not generally result from such eating, but partly also because, till public attention is drawn to the subject, it must be difficult to trace to their true cause any ill-effects which are thus occasioned. Mr. Gamgee tells me that he has experimented on this subject,—and that dogs and ferrets, to which he has given (cooked) various parts of animals slaughtered during splenic apoplexy or parturition-

\* See especially in Virchow's Archiv, vol. 18, papers by the Editor and by Prof. Zenker of Dresden. Prof. Zenker incidentally mentions, that among 136 post-mortem examinations which he made during eight months of the year 1855, he found four subjects evidently affected with trichina. He gives in detail the case of a farm girl who died under his observation in 1860, killed by trichina. She had a month before been taking part with the other farm-servants in a particular pig-sticking and in the consequent processes, and had probably (according to what is said to be a not very unusual practice) taken an occasional pinch of the sausage-meat which she had to chop. She soon fell ill, and died in five weeks. Her bowels contained swarms of adult trichinae, and the voluntary muscles throughout her entire body were colonized by myriads of larvæ. It appeared on inquiry that other persons who took part in slaughtering the same pig also suffered, and that, though none died, two were bedridden for weeks. Microscopical examination of products which were remaining of the slaughtered pig—ham, sausages, and black puddings—showed in them innumerable dead trichinae. While the present report is being printed, a contemporary number of Virchow's Archiv (vol. 27, p. 421) contains a paper by Dr. C. Tünger of Hamburg, giving particulars of a case in which certainly one death was caused, and perhaps also a second death, as well as some not fatal illness, by the consumption of trichinous pork on board ship. Of the two deaths, one occurred on the 24th, the other on the 27th day after that on which the pig was slaughtered, and the consumption of its flesh begun.—July, 1863.—J.S.

fever, have died in consequence of the meal; but, on the other hand, M. Renault—formerly Director of the Imperial Veterinary College at Alfort—is quoted,\* as believing that meat from carbuncular animals is harmless. It seems to me that in this question, which concerns so many diseases and so many different stages of disease, somewhat extensive investigations are wanted, to fix accurately the limits between safe and unsafe consumption. But that human life may, under some circumstances, be endangered through the use of cooked meat derived from animals with anthrax, seems to be conclusively shown by the following case, with which Mr. Keith, Senior Surgeon of the Aberdeen Royal Infirmary, has favoured me. "In the first week of November 1840, on the farm of "Mr. G—, near K—, in Aberdeenshire, a two-year old "quey was observed to be unwell, supposed to be threatening "the 'quarter-ill.' She was in consequence slaughtered by the "ploughman, aided by a neighbouring blacksmith. On skin- "ning the animal the flesh generally presented a healthy aspect, "except that here and there, round, black, ecchymosed spots, "quite circumscribed, were visible over the carcase. When "these patches were cut out the meat seemed so healthy to "look at, that the owner resolved to salt it down as his "winter mart, a portion of the animal being reserved for "present use. A boil of this beef was cooked next day in a "pot of broth to dine the whole family, consisting of 11 in- "dividuals—father, mother, six grown-up sons or daughters, "an aunt, horseman, and housemaid. Of the 11, two, viz. "the father and the servant, did not partake of either the "beef or the broth, and these both remained well, while the "other nine who partook more or less largely of both were "soon after seized with such alarming symptoms of poisoning "that a medical man was at once called in. The symptoms "he found most urgent were dead sickness, with vomiting, "great prostration of strength, soon followed by looseness of "the bowels. By active evacuants, followed by the free use of "stimulants, and that succeeded by quinine, seven recovered

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\* See Virchow in his Handbuch der Pathologie und Therapie, vol. ii. p. 97. See also Chevallier, Dictionn. des Altérations et Falsifications des Substances Alimentaires Médicamenteuses et Commerciales, vol. ii. p. 55.—J.S.



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“ in a few days, but one daughter died on the fourth day, and  
“ the mother sank on the fifth, both in a typhoid state. On  
“ the 12th of November 1840, the ploughman, James Robert-  
“ son, who slaughtered the said cow, and the blacksmith,  
“ Alexander Andrews, who assisted him, were admitted into  
“ the Royal Infirmary of Aberdeen, under the care of Dr.  
“ Keith, both labouring under phlegmonous erysipelas of one  
“ arm each, with high fever and delirium. No wound or open  
“ sore could be detected on the ploughman's hand or arm to  
“ account for inoculation, but it was surmised that he had  
“ partaken of the meat; but in the case of the blacksmith,  
“ who had not tasted the meat, he pointed to a large malig-  
“ nant pustule on the knuckle of his left, much swollen  
“ thumb, and stated that he had cut that knuckle while in  
“ the act of skinning the cow. Gangrene seemed imminent  
“ in both arms, from the finger tips to the axilla, vesications  
“ having already risen at various places; free and deep in-  
“ cisions instantly relieved tension; hæmorrhage from the  
“ cut vessels soon subdued the febrile excitement. One smart  
“ calomel purge, and then recruiting. The one was dismissed  
“ cured at the end of 22, and the other at the end of 26 days.  
“ These parties communicated the whole circumstances of the  
“ case to the writer, and already, before they came to the  
“ hospital, the two victims were dead. It was further stated  
“ that the offal of the cow was cast into a dung-hill, to which  
“ two grown swine had access. These ate of it freely, were  
“ taken ill, and both died. These facts are to depend on.  
“ The one point on which I am in doubt is as to whether it  
“ was the mother or the aunt that was the second victim; but  
“ that two died there is no doubt. The affair created a great  
“ sensation in the district, and has hindered the repetition of  
“ any similar occurrence; but it is to be feared it has also led  
“ to the more early disposal of the sick cattle for slaughter,  
“ to be sent off to some distant market.” In a letter of further  
information which Mr. Keith has been good enough to write  
to me, answering various questions I had asked him, he says:—  
“ I learn that the meat cooked was quite fresh, and healthy  
“ to look at, and that the fatal dinner was cooked *on the very*  
“ *day the animal was killed*, so that putrescency had nothing

“ to do with the matter. I further learn that one of the Cattle diseases  
“ females—the servant—had suspicion that it might not be in relation to  
“ safe to eat of the meat, and therefore it was that she supply of Meat  
“ abstained, and was safe, as already stated. The father and Milk.  
“ habitually abstained from animal food, and did so that day  
“ and escaped. One other of the females only took of the  
“ broth, and no beef, and escaped more easily than any of the  
“ others.”\*

(c.) As regards possible ill-effects from consuming, in a well-cooked state, the flesh of animals which have been suffering an *infectious fever*,—small-pox, typhoid fever, pleuro-pneumonia, or aphtha,—I have no inculpatory evidence worth quoting. And as regards the last two diseases, common as they are in this country, I am of opinion that the absence of evidence is enough to show that immediate ill-effects of any considerable importance do not ordinarily follow the consumption of the meat. Indeed it is certain that on various occasions meat of this description has been consumed on so large a scale that, if the meat had been immediately hurtful, the consequent mischief could not have escaped observation.† On the other hand, I must repeat that, till public attention is drawn to such subjects as these, it is difficult to prove connexions, which afterwards become evident, between evils and their latent causes. And particularly in this point of view I must advert again to the unexamined part of this question,—the doubt whether chronic ill-effects (which of course would be singularly difficult to trace) may perhaps result, when febrile meat—meat which necessarily is of modified chemical constitution—becomes a considerable element in diet. An opinion is sometimes expressed, that boils (perhaps with other like

\* Many cases, less circumstantially stated, but generally to the same effect as the above, may be found scattered in journals of veterinary medicine, especially in those of Germany, for the last few years, as well as in older publications. And cases are comparatively numerous where birds, dogs, pigs, and cats have died after taking even small quantities of the blood or offal of recently-slaughtered carbuncular animals.—J.S.

† See instances, in the section which relates to food in Lévy's *Traité d'Hygiène*.—I am informed that some years ago during an epidemic of cattle-typhoid (rinder-pest) in Bohemia, the poor people had the habit of digging up, for food, the carcasses which the authorities had had buried, and that no harm was observed to result from this practice.—J.S.

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affections) are caused in the human subject by the consumption of such meat as I refer to. And though I have not yet found any fact which I can deem conclusive in support of this opinion, I must admit that the alleged connexion is not *prima facie* impossible.

(d.) Before leaving the subject of cattle-diseases in their relation to the supply of meat, I must mention, as a danger incidental to the consumption of meat from diseased animals, that, in some cases, the meat may be injurious in consequence of the animal having been *excessively drugged during life*. Mr. Gamgee mentions cases, where animals recently drugged with arsenic and strychnia have been used for human food. He quotes a very striking case, reported nine years ago in Germany, to the effect that signs of poisoning arose almost as an epidemic among 321 persons who had eaten of the flesh of an ox, which during life had been dosed with tartar emetic and had had perhaps two ounces of that drug; that, of the 321 persons who ate of the ox, 107 suffered, and one of them fatally, from violent gastro-intestinal disturbance; that anti-mony was chemically found both in the flesh of the ox, and in the interior of the person who died; and that doses of the flesh given experimentally to other animals produced signs of poisoning. Generally it might be expected that no drugging of an animal, in doses not sufficient to poison it, could render its flesh capable of acting as a poison on man.

In conclusion, lest I should seem to have ignored any important existing evidence on the subject of the dangers which are attributable to the consumption of diseased meat, I think it right to observe that, in popular discussions of this subject, and even in some of the medical writings which relate to it, sufficient care has not, in my opinion, been taken to separate two important questions,—the question of meat's being rendered *unwholesome by decomposition*, and the question of meat's being rendered *unwholesome by disease*. Among the cases which I see adduced as illustrations of mischief from diseased meat, are some which, for aught that appears, may only illustrate the well-known fact, that, even in presumably healthy meat, poisonous properties, different from those of common putridity, are sometimes developed by decomposition.

And although, for the interests of public health it is desirable that cases of the latter kind (and indeed all cases of alleged injuriousness of food) should receive their due share of attention, yet, for the immediate purposes of the present discussion, they must of course be regarded as irrelevant.

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With regard to that minor branch of the inquiry which relates to the MILK of diseased animals,—it appears that, in this country, the most important question is as to the wholesomeness of milk from *animals with aphtha*. Mr. Gamgee points out that on some occasions when aphtha has been prevailing among the cattle of a country, the human population in the same places has suffered from the same or from some similar disorder. And experiment\* seems to have established as certain, that, at least under some circumstances the human affection may be caused by the consumption of milk drawn from a diseased animal. It may be that the frequency of such communications of the disease, as compared with the number of persons who (more or less) are consumers of milk, is not great. But the danger is one of which the

\* More than 20 years ago Prof. Hertwig published particulars of such experiments performed by him on himself and two friends with the result of producing a very definite eruptive fever.—J.S.

† See, on this side of the question, the Report which was made to the Préfet of the Seine by M. Huzard fils, in 1839, when aphtha was extensively present in the Paris dairies. Among his conclusions are these:—§ 41. Quand la maladie a été connue à Paris comme maladie épizootique, il y avait déjà quelque temps qu'elle régnait; elle était à son *maximum* sous le rapport du nombre des bêtes malades; déjà le lait était consommé journellement, et cela, depuis le commencement de la maladie, sans que l'attention eût été appelée par quelque dérangement dans la santé publique.

“ § 42. Dans les années 1810, 1811, 1834, et 1835, où la même maladie avait régné à Paris, il n'y avait eu aucune précaution prise pour interdire la vente du lait; cet aliment avait été consommé comme dans les années ordinaires, et aucune épidémie n'était apparue.

“ § 43. Dans les provinces où elle régnait depuis le commencement de l'année dernière, on n'a point interdit la vente du lait, et il n'y a eu aucun accident, aucune affection connue qu'on ait pu attribuer à la consommation de cet aliment.

“ § 44. Le lait des vaches malades, donné au sortir du pis, aux porcs, aux veaux mêmes, n'a point eu d'inconvénient pour ces animaux, et si des veaux ont eu la maladie, il en est qui n'en ont point été atteints après s'en être nourris exclusivement pendant un laps de temps assez considérable.”—See Annales d'Hygiène Publique et de Médecine Légale, vol. 22, p. 296.—J.S.

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public ought to be aware. Further inquiry is wanted to ascertain whether the allegation, which has been both made and contradicted, be true or untrue,—that the milk of apthous cows, if used for food (especially by young children, who are likely to be the largest consumers of it) is apt to produce disturbance of the stomach and bowels.

Mr. Gamgee in sundry parts of his Report states his belief that a very large proportion of the disease which now habitually prevails among live stock in the United Kingdom, and which he estimates as proving fatal to stock to the immense pecuniary amount of "more than six millions sterling" per annum, *might by proper measures be prevented*;—viz.,—that the epidemic diseases are due entirely to contagion, originally foreign, against the introduction and spread of which our present precautions are, in his opinion, not sufficient; and that the most destructive endemic diseases are due, partly to local malaria which improved land-drainage would dispel, and partly to dietetic mismanagement of stock. Though it is not any part of my present duty to enter upon a consideration of the important questions which are here opened, I have felt myself bound to bring these parts of Mr. Gamgee's Report under their Lordships' particular notice.

#### From the Sixth Report to the Privy Council, 1863.

[The Sixth Report comprises a section on Vaccination which has appeared in Vol. I., pp. 361-4. There follows a long and most important section, which is given below under the uniform heading of "Distribution of Disease in England," and which in this report is dealt with under several sub-sections, viz.:—1. Conditions of Nourishment: (i.) the Food of the Poorer Labouring Classes; (ii.) the Causes of Sea Scurvy in the Mercantile Marine. 2. Hurtful or hurtfully-conducted Occupations. 3. Residence in Marsh Districts: (i.) as regards Ague and other malarious diseases; (ii.) as regards the mortality of infants. 4. Hospital hygiene in relation to Traumatic infections and the spread of contagious fevers. 5. Accidental and Criminal Poisoning, which has already appeared in the portion of Vol. I., pp. 541-50, relating to the Practice of Pharmacy in Great Britain. The report for 1863 concludes with an account of "Miscellaneous Proceedings" which had reference to outbreaks of small-pox and typhoid fever; an inquiry at Rotherham

"on account of the very exceptional occurrence of a considerable epidemic of jaundice;" an inquiry into an alleged endemic prevalence of tapeworm in and about Chapel Town, near Sheffield; an inquiry by Mr. Robert Ceely into the particulars of an outbreak of "anthrax fever" at Swineshead, Lincolnshire, which was of especial interest, not only as affecting several kinds of domestic animals, but also in regard of its possible relations to disease of the human subject; and several illustrations "of the circumstances under which typhoid-fever and the other diarrhoeal infections continue to be extensively prevalent in this country."—Ed.]

#### DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED.—cont.

For the last five years there has been in progress, under direction of the Privy Council, a systematic and continuous inquiry into the circumstances which regulate the distribution of disease in England.

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stances by  
which it is  
regulated.

My report of 1858, *on the preventability of certain kinds of premature death*, has served as a programme to the inquiry, and, from 1858 till now, the results, as far as obtained, have, year by year, been given in my successive annual reports. Sometimes the inquiry has started from known local EXCESSES OF A PARTICULAR DISEASE; and by proceedings in this form the ætiology of several of our most important diseases has been investigated;—as, for instance, of diarrhoea and diphtheria in 1859,—of phthisis and other lung-diseases in 1860 and 1861,—of diseases causing infantile mortality in 1862,—and of typhoid fever in all the years, but especially in 1860. Sometimes, on the other hand, the form of the proceeding has for convenience been that of investigating the operation of a KNOWN MORBIFIC INFLUENCE;—as, for instance, in 1862, in the inquiries into the effects of working with arsenical green, and into the effects of working with phosphorus. During the year 1863 further proceedings of both sorts were ordered by the Privy Council, and considerable additions were in consequence made to the stock of information which their Lordships had previously collected. Inquiry of a third sort— inquiry, namely, as to the sufficiency with which the primary wants of the body are satisfied among the poorest classes of the population, has been begun, and in one very important particular—the particular of FOOD, somewhat extensively



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conducted. I append in extenso the reports of the several gentlemen who have acted as inspectors for those various inquiries of the Privy Council during the year 1863. And I have now to submit some few observations of my own on the several matters of inquiry.

Nourishment.

### 1. *Conditions of Nourishment.*

#### (i.) *The Food of the poorer Labouring Classes.*

Food of the poorer labouring classes.

That no sanitary necessity can be more real than the common animal need of proper food,—that no morbid influence can be of worse import to life than mere privation of nourishment,—these are propositions which everyone feels to be true, when they are illustrated in individual cases of death by starvation, or in those national extreme sufferings of scarcity which constitute famine. But the propositions are not exclusively true in that utmost range of their application. In degrees far short of what is popularly known as starvation or famine, insufficiency of nourishment may bring very hurtful consequences to health. Local defects or local peculiarities of diet may exercise important influence in determining or colouring particular localisations of disease. And generally it may be said, that in order justly to estimate the sanitary circumstances of a people, scientific regard must be had to the quantity and quality of the people's meat and drink.

It was in this point of view that my Lords, in 1863, thought it desirable to order an inquiry to be made into the dietaries of our lowest-fed populations. The inquiry which their Lordships had made in 1862 into the nourishment of the distressed operatives in Cheshire and Lancashire had not only made obvious an existing want of general information with regard to the dietaries of the poor, but had also well shewn the principles on which such information could best be collected and generalized:—and Dr. Edward Smith, who had made that former inquiry for their Lordships, was the gentleman whom under their orders I instructed to make the present more general one.

The inquiry was (like all their Lordships' inquiries) essentially for the purposes of England. But, even for these

purposes, some exterior standards of comparisons were wanted. And accordingly, just so far as was necessary for that end, information was sought also in Scotland and in Ireland. The number of households visited was, in England and Wales 553, in Scotland 29, in Ireland 52. In 125 cases (all English) the inquiry related to the poorer classes of in-door work-people,—silk-weavers, needlewomen, glove-stitchers, stocking-weavers, shoemakers, &c., who, almost entirely, were town-residents. In nearly all the remaining 509 cases, the inquiry related to farm-labourers.

This statement of numbers will sufficiently show that the inquiry did not pretend to be exhaustive. Indeed, for obvious reasons, it could but be an examination of *samples*; and in such an examination (exceedingly small, of course, in proportion to the entire mass which has to be judged about) the trustworthiness of the results depends entirely on the degree of success attained in finding samples which are thoroughly typical. Having regard to the dimensions of the inquiry, I cannot venture to say that such success has in every instance been quite perfectly attained; but adverting to the precautions which Dr. Smith took in this respect (and which he describes in the commencement of his report) I feel assured that every selected case may be deemed representative of considerable numbers of families, and that therefore the results of the inquiry may at least be accepted as true for large masses of population.

The results of the inquiry are not so much for any present separate application, as for use, connectedly with other facts, in future sanitary judgments. But while for this reason I may now well leave without comment most of the collected information, there are yet some parts of it to which I would draw attention, as, in my opinion, of more immediate public interest.

As the inquiry specially related to the feeding of our lowest-paid labouring classes, it was to be expected that evidence of very poor diet would often be met with. And such proved to be the fact. Throughout some of the examined classes, and in appreciable sections of the remainder, the diet was (to say



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the best of it) of doubtful permanent sufficiency for health. For the examined agricultural populations, the diet was not so poor as for the examined in-door operatives. In both classes, of course, poverty was found to tell least upon those who were without families. And in both classes, but very especially among the agriculturists, insufficiency of food does not nearly so much affect the married labourer as it affects his wife and children. For he, in order to do his work, must eat. Particularly if the agricultural labourer be fed at his employer's house, and most of all if he (being unmarried) lives there, he will commonly fare well. Even sometimes, when thus circumstanced, he will feed to excess. But at least the wives and children of the examined agricultural populations, and doubtless, to some extent, even the labourers themselves, are in some counties miserably fed. The worst deficiencies, however, were found among the examined classes of in-door operatives. They, taken as a whole, are so ill-fed that assuredly among them there must be many instances of severe and injurious privation.

Dr. Smith's former report, made at the time when most public alarm was felt for our unemployed operatives in the cotton towns, contained a theoretical estimate of the minimum quantity of food on which human life could reasonably be expected to subsist, and that estimate formed the scientific basis for such advice as was given to the cotton towns on the subject of their allowances for the poor. Its purport was, that, in order to avert starvation-diseases, an average woman's daily food ought to contain at least 3,900 grains of carbon with 180 grains of nitrogen, and an average man's daily food at least 4,300 grains of carbon with 200 grains of nitrogen,—i.e., for the woman about the same quantity of the nutritive elements as is contained in two lbs. of good wheaten bread, and for the man about a ninth part more. Taking the mean of the two allowances, male and female, the estimated weekly need of an average adult would be for at least 28,600 grains of carbon and 1,330 grains of nitrogen. It will be observed (see annexed table) that, in only one of the examined classes of in-door operatives, did the average nitrogen-supply just exceed, while in another it nearly reached, the estimated

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Class.	No. of Families Examined.	Average Weekly Supply for each Adult.	
		Carbon.	Nitrogen.
Silkweavers - - -	42	27,620	1,151
Needlewomen - - -	31	22,900	950
Kid-glovers - - -	10	28,623	1,213
Shoemakers - - -	21	31,700	1,332
Stocking-weavers - -	21	33,537	1,316
Average - - -	- - -	28,876	1,192
Minimum Allowance advised for unemployed Cotton Operatives - -	} - -	28,600	1,330

standard of bare sufficiency, and that in two classes there was defect—in one a very large defect—of both nitrogen and carbon. Moreover, as regards the examined families of the agricultural population, it appeared that more than a fifth were with less than the estimated sufficiency of carbonaceous food, that more than one-third were with less than the estimated sufficiency of nitrogenous food, and that in three counties (Berkshire, Oxfordshire, and Somersetshire) insufficiency of nitrogenous food was the average local diet.

Of course I do not insist on the grains of this comparison. The estimate which serves as the standard for it was, I repeat, a theoretical estimate. Even in that sense it was never deemed more than approximative and provisional; nor could any theoretical estimate be deemed superior to correction from results of actual observation. But, taken for what it is, taken as the scientific, though necessarily imperfect estimate, made only some eighteen months ago, of what quantity of food might on an average just suffice to "avert starvation diseases," it has some significance as a standard. Moreover, at the time when it was made, it had this sort of practical corroboration,—that apparently it agreed very nearly with the very scanty amount of nourishment to which the unemployed operatives under pressure of extreme distress had actually reduced their consumption of food. And now, if averages be looked to, the present empirical results are not inconsistent with it; for, with the mass of examined in-door

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ing classes.

operatives, where alone the average food consumption of considerable numbers of persons was found below that standard of comparison, the average state of health was unsatisfactory.\* To this fact, however, if it stood alone, I should not impute any degree of conclusiveness, as proof of disease resulting solely from scantiness of nourishment. Had the inquiry aimed at the collection of such proof, much larger numbers of extreme cases must have been observed, and minute regard must in each case have been had to details of bodily health, and to other sanitary circumstances than the single influence of diet. That cases are innumerable in which defective diet is the cause or the aggravator of disease, can be affirmed by any one who is conversant with poor-law medical practice, or with the wards and out-patient rooms of hospitals. But the present materials do not pretend to be proof in that particular. They may be regarded as simply expressing the dietetic habits (apart from the sanitary state) of that part of the labouring population which is habitually least above destitution.

Yet in this point of view there is, in my opinion, a very important sanitary context to be added. It must be remembered that privation of food is very reluctantly borne, and that, as a rule, great poorness of diet will only come when other privations have preceded it. Long before insufficiency of diet is a matter of hygienic concern, long before the physiologist would think of counting the grains of nitrogen and carbon which intervene between life and starvation, the household will have been utterly destitute of material comfort:—clothing and fuel will have been even scantier than food,—against inclemencies of weather there will have been no adequate protection,—dwelling space will have been stinted to the degree in which over-crowding produces or increases disease,—of household utensils and furniture there will have

\* And it must be remembered that Dr. Smith, for reasons which he states at the beginning of his report, made it one of the rules for his selection of sample-families, that the health of the families should, as far as was known, be good. It may be that if this rule had not been acted on, the sanitary complexion of the evidence would have expressed far more privation than it does. But the form of the inquiry must then have been entirely altered, and the main object of the inquiry could not have been equally well attained.—J.S.

been scarcely any,—even cleanliness will have been found costly or difficult, and if there still be self-respectful endeavours to maintain it, every such endeavour will represent additional pangs of hunger. The home, too, will be where shelter can be cheapest bought;—in quarters where commonly there is least fruit of sanitary supervision,—least drainage,—least scavenging,—least suppression of public nuisances,—least, or worst, water supply,—and, if in town, least light and air. Such are the sanitary dangers to which poverty is almost certainly exposed, when it is poverty enough to imply scantiness of food. And while the sum of them is of terrible magnitude against life, the mere scantiness of food is in itself of very serious moment. From such degrees of it as Dr. Smith found existing among the lowest fed of the examined classes, there must, I feel assured, be much direct causation of ill-health, and the associated causes of disease must be greatly strengthened by it in their hurtfulness. These are painful reflections, especially when it is remembered that the poverty to which they advert is not the deserved poverty of idleness. In all cases it is the poverty of working populations. Indeed, as regards the in-door operatives, the work which obtains the scanty pittance of food is for the most part excessively prolonged. Yet evidently it is only in a qualified sense that the work can be deemed self-supporting. All disease of such populations, and whatever destitution results from it, must be treated at the public expense; and on a very large scale the nominal self-support can be only a circuit, longer or shorter, to pauperism.

Also, it seems to me that, where higher degrees of plenty exist, there, very important drawbacks are to be counted. If the wife has been earning money, she has been withdrawn more or less from her housekeeping and motherly duties:—and I must say that, the more knowledge I get of the sanitary circumstances of the poor, the more reason I find for dreading any considerable development of that mode of increasing income. Or, if the children have been earning money, they probably have been more or less withdrawn from opportunities of rudimentary education. In either case

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ing classes.

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ing classes.

(and of course often both cases concur in the life of a single household) a better present livelihood is got;—but the price paid for it is in effect a mortgage on the future of the family,—a mortgage which is almost sure to result in the family's eventual deterioration. Particularly I must advert to the lamentable moral (as well as physical) consequences which tend to ensue on various industrial employments of adult women;—a subject which has been in part treated in my Fourth Report, and will now again be strongly illustrated by facts which I have presently to bring forward.

How far (if at all) the described circumstances of our poorest labouring population tend to better themselves, and how far (if at all) they may be bettered by interference from without, are questions which cannot be discussed without reference to parts of political economy on which I am incompetent to speak. Indirectly, indeed, those questions are of the vastest sanitary importance:—for the “public health” of a country means the health of its masses, and the masses will scarcely be healthy unless, to their very base, they be at least moderately prosperous. And although the satisfactory solution of those questions is a task for other sciences than the science of medicine to fulfil, yet assuredly, if that solution can be given, the ultimate result will be among the foremost gains which a department of public health can have to record.

Meanwhile, however, there are some parts of Dr. Smith's report to which I would particularly refer, as showing how much better is the state of the agricultural population in some parts of the country than in others, and as tending to show what are the favourable influences in determination of such superiority.

Especially I would advert to the indications which his report contains of the great value of cottage gardens, and to the causes which he assigns for the extensive non-consumption of milk among our agricultural population, and to the remarks which he makes on deferred payment of wages and on disadvantageous allowances of drink. And, in another point of view, I would with equal urgency advert to the

considerable differences of economy which there are, and this in town as well as in country, between different poorly nourished households,—to the many illustrations which there are that sensible improvements of the family feeding might be made if but the small economics of diet were understood. Such passages as those to which I refer will show how the poor may most effectively be assisted by others, and how they may most effectively help themselves. Above all, perhaps, it is important that the employers of labour, and the better off classes generally, should understand how many forms of help there are which represent money's worth to the recipient without representing money's loss to the giver. Dr. Smith's report abounds with illustrations of this; and there is one other which I will venture to name. Often the most permanently useful form of help which the better-off classes can afford to the poorest will be the mere imparting of information. For surely the poor man will best succeed in helping himself when he shall have most knowledge appropriate to his circumstances;—not alone when he shall have learnt how to obtain without wasteful purchase or wasteful cookery the fullest vital value for his scanty spendings on food; but perhaps even more, when he shall also have learnt the full economical meaning of the unwholesome and degrading uncleanness amid which he is now often condemned to live or die,—when he shall have learnt what false thrift there may often be in sending forth wife and untaught children even to bread-winning labour,—and when, with ambition to aim at higher standards of life for himself and for them, he shall be enabled to compare his own local earnings and struggles with those of other sections of the world's proletariat, and in such comparisons shall have the means of judging for himself where is the best market for his special industry, and what are the best terms which, singly or with other men, he can get for it.

In reference to some of these questions, it is of interest to advert to the wide differences of nourishment obtained by agricultural labourers in different parts of the United Kingdom,—differences which are in great part due to actual differences of prosperity, and which in other part are due



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to differences of an important kind in the dietetic habits of the people. Thus, so far as the present report furnishes materials for comparison between different parts of England, the food of the agricultural population is in some counties 50 per cent. better than in others. Compare, for instance, in the annexed table, the quantities of the nutritive elements contained in the

Quantities of carbon and nitrogen weekly consumed by an average agricultural adult in the undermentioned counties of England.			
Counties for Comparison.	Carbon. grs.	Nitrogen. grs.	
Northumberland - -	48,648	2,034	
Westmoreland - -	42,149	1,908	
Warwickshire - -	47,557	1,732	
Suffolk - -	47,064	1,744	
Durham - -	44,589	1,862	
Berkshire - -	37,059	1,193	
Oxfordshire - -	35,651	1,322	
Somersetshire - -	33,832	1,290	

apparently average dietaries of Northumberland, Westmoreland, Warwickshire, Suffolk, Durham, Berkshire, Oxfordshire, and Somersetshire respectively. The differences here illustrated probably represent, though of course not exactly, differences of labouring prosperity; but the effect of difference of dietetic habit may be shown by comparing with one another the four divisions of the United Kingdom in respect of their agricultural populations. So far as the present materials suffice for the making of such comparisons, it seems that, of the divisions of the United Kingdom, England is considerably the worst fed. A very important difference is, that the agricultural labourer gets in England only a quarter as much milk as in Ireland or Scotland. In Ireland too the bread-stuffs are more than half as much again as in England. And Scotland, which stands lower than Ireland in bread-stuffs, is enabled (thanks in part to its braxy mutton) to exceed Ireland considerably in meat. In Wales there is a third less milk than in Scotland or

Ireland, but there is cheese to make up for the difference. And the broad results, stated according to the chemical elements contained in the respective divisional dietaries, are those which the annexed table represents.

Quantities of carbon and nitrogen weekly consumed by an average agricultural adult in each of the four divisions of the United Kingdom.		
Divisions of the United Kingdom for Comparison.	Carbon. grs.	Nitrogen. grs.
England - - -	40,673	1,594
Wales - - -	48,354	2,031
Scotland - - -	48,980	2,348
Ireland - - -	43,366	2,434

(ii.) *Causes of Sea-Scurvy in the Mercantile Marine.*

To one particular disease of defective nourishment—to the so-called scurvy which results from absence of vegetable food, their Lordships during 1863 thought it expedient to give separate consideration. Their Lordships indeed knew that our general population does not now suffer any appreciable detriment from that entirely preventable and almost entirely prevented disease. But their Lordships also knew that scurvy, notwithstanding its entire preventability, is still sometimes to be found, under very censurable circumstances, among a class of persons whom the law purports specially to protect from it. They knew, namely, that to some uncertain extent, and as the result of illegal neglect, it was still occasionally occurring in the Mercantile Marine. And in order that they might have before them all attainable data for estimating the degree to which the evil prevails, I under their direction requested Dr. Robert Barnes, Physician to the Hospital Ship "Dreadnought," to report such information as he had, or could collect, with regard to the prevalence, and the circumstances of prevalence, of scurvy among sailors in the Merchant Service.

Dr. Barnes's report shows that, of the entire number of men received into the Stranger's Home at Poplar, nearly half are,

Sea-Scurvy of Merchant Seamen.



Sea-Scurvy  
of Merchant  
Seamen.

at the time of their admission, suffering more or less from scurvy, and of these perhaps a twentieth part seriously diseased with it;—that, of the entire number of cases admitted during the last twelve years into the Hospital Ship “Dreadnought,” cases of scurvy have formed a twenty-fourth part;—that to these must of course be added sufferers who are not taken into such establishments as the above—“a large but uncertain number of cases taken into the low lodging-houses of the water-side”;—but that this is for London alone, and is not nearly all due to London shipowners;—that, of 86 cases of scurvy treated in the “Dreadnought” during 1863, only 14 came from ships which had issued from the port of London, while 31 came from foreign ships, 21 from Liverpool ships, 8 from Sunderland ships, and 12 from Glasgow and other British ships;—that Liverpool ships, besides furnishing to London a large proportion of the scurvy which is treated here, convey probably a much larger quantity of the disease to their own port of departure,—that, at all events, during 1863, 50 cases (all probably severe) were admitted at the Liverpool hospitals, and during 1862 a dozen cases at the Glasgow and Greenock Hospitals;—that shipowners of Liverpool and other northern ports, and of Hamburg and America, are those who “exhibit the greatest amount of disregard of the safety and health of their crews. The plight in which the poor sailors from certain services are admitted is pitiable to witness. Disabled by hardship, semi-starvation, and ill usage of every kind, they are cast out with the same indifference with which a worn-out block would be thrown overboard.”

Apart from the not insignificant question here raised of cruelty from master to servant, there is another question raised by Dr. Barnes as deserving of public consideration. “When it is remembered that the security of this country has on several occasions been imperilled by the disablement of the Royal Navy through scurvy, it may be presumed that the same cause will imperil the safety of our merchant ships. And there can be no doubt that many ships have actually foundered at sea because the crews were so prostrate from scurvy as to be unable to handle them when overtaken by severe weather. It has been the custom to inquire what

“proportion of the crews were disabled by scurvy. As might be supposed, in the case of a disease resulting from a cause operating upon the entire crew, this proportion is often very large. Thus there were recently admitted on board the ‘Dreadnought’ 12 cases of severe scurvy from one ship; two others were known to be seriously affected; and the entire complement of officers and men was only 19, leaving but five men in all able for duty to work the ship. Similar cases are not uncommon. It will be seen from Supplement C., that the proportion of the crew disabled has ranged from 20 per cent. to 70 per cent. It is certain that scurvy ships have rarely a hand to spare. Deprive such ships of a fourth, a half, or two-thirds of their force, and the peril of ship, cargo, crew, and passengers in stress of weather is obvious. A crew of five men, for example, could not reef topsails or bring the ship to in a gale of wind. And it must not be forgotten that where scurvy has prostrated a large part of the crew the vigour of the remainder is sure to be sapped, so that there may not remain a single sailor before the mast in a state of thorough efficiency. It cannot be doubted, further, that scurvy, being one result of the recklessness of owners and captains in regard to the health and lives of seamen, is a great cause of demoralisation among sailors. This in itself is a serious evil.”

It is unnecessary for me to justify in much detail the assumption with which I started, that scurvy is an entirely preventable disease. Privation of vegetable food is its one essential cause. The giving of vegetable food is its one essential counteractive. This fragment of the science of preventive medicine is now well known to all the world. It was scurvy which used to decimate our navy, and render long sea voyages almost impossible;—it was mainly by scurvy that Anson in his celebrated voyage of 1740–2 lost, within the first 10 months, nearly two-thirds of his crew, and during the remaining period about half of the survivors;—and it was against scurvy that Cook had attained his triumphant success, when in 1775, after three years’ absence, he brought back a healthy crew which out of 112 men had lost only one by disease. Cook’s great example gradually got to have its due weight. Twice, indeed,

Sea-Scurvy  
of Merchant  
Seamen.

in the next 20 years, our Royal Fleet had scurvy enough to endanger its existence. But then the better knowledge and better practice began to make effectual way. The year 1796 was (says Sir Gilbert Blane) marked "as an era in the " history of the health of the British Navy," by the general introduction of lemon juice; and an illustration of the effect of this change is that at Haslar Hospital, which even in the year 1780 received 1,457 cases of scurvy, scurvy is now an almost unknown disease.\*

On what circumstance then does it depend that scurvy, to a noticeable amount, is still found in the Merchant Service? Surely not from ignorance;—for the ships which show how to produce the disease show also how to prevent it;—"Scurvy" (says Dr. Barnes) may be prevalent in the fore-castle, but it is " never known in the cabin; if the captain and mates know " how to preserve themselves, they know how to preserve " their men."

The one thing wanted in order that scurvy should be entirely banished from the Mercantile Marine, is proper provision for the dietary of the crew;—such provision as is enforced in emigrant ships,—where each person's weekly allowance must have in it at least 8 oz. of preserved potatoes and 3 oz. of other preserved vegetable (carrots, turnips, onions, celery, and mint) besides pickles and 3 oz. of lime juice,—where also there is considerable variety of bread-stuff, and where, on two days of the week, preserved (not salted) meats must be given. With such a dietary as this, the details of which might be varied, provided its principle were adhered to, the occurrence of scurvy would be impossible. And even with dietaries

\* In the middle of the 17th century the deaths by scurvy in London averaged about 30 per annum, but in particular years the average was greatly exceeded. For instance during the years 1655-9 they averaged 86, and in the great plague-year were 105. That amount of land-scurvy, and doubtless a far larger amount in more distant times, depended on the same causes as those which still develop sea-scurvy. Vegetable food was as yet so little cultivated, and the animal food consumed in winter was to so great an extent salt-meat, that perhaps the land-men of those days were not better off than the seamen of these. It is said that the most common articles of the kitchen garden, such as cabbage, were not cultivated in England a century ago, and that in Tudor times Queen Catherine of Arragon could not procure a salad till a gardener came from the Netherlands to raise it for her.—J.S.

inferior to that just described, scurvy would not occur as it does, if but the provisions of the Merchant Shipping Act (17 & 18 Vict. c. 104) were obeyed—that whenever a crew shall have been consuming salt provisions for 10 days, lime or lemon juice and sugar shall be served out at the rate of half an ounce each per day,—and if during the voyage the opportunities which offer themselves were fairly used for getting new supplies of fresh animal and vegetable food. But in both respects there is default. Owners disobey the law, and captains neglect opportunities to cure the results of this disobedience. Owners, notwithstanding the law, will send forth their ships on long voyages without any provision of lime juice or with lime juice insufficient in quantity, or with lime juice of which the quality is bad; and "captains, with " half their crews more or less disabled, are known to run past " St. Helena or the Western Isles when a few hours' delay " would obtain sufficient provisions to repair the mischief " occasioned by first neglect."

After carefully considering the statements made in Dr. Barnes's report, I concur with him in thinking that the intentions of the Merchant Shipping Act, so far as concerns the prevention of sea-scurvy, are not likely to be altogether realized unless particular inspectional regard be had to breaches of the Act. Probably it might without much inconvenience be arranged that, in every case of the arrival of a ship from a long voyage, the inspecting officer of customs should take means to ascertain whether there be or have been any scurvy on board, and that if thus or otherwise it should appear that scurvy has been prevailing, inquiry under the Merchant Shipping Act should be held whether a punishable offence under that Act had been committed. And assuredly, in every case of death occurring in this country from sea-scurvy contracted on board ship, it would be desirable that a coroner's inquiry should be made into the circumstances under which the disease had arisen.

## 2. *Hurtful or hurtfully-conducted Occupations.*

Employments which injure the health of the employed may be injurious in either of two ways, and may accordingly

Industrial  
diseases.

be considered as divisible into two classes. In the one class, the work is naturally unwholesome, and, except in so far as its natural unwholesomeness can be and is counteracted by artificial contrivances, the employed must suffer in health. In the other class, the work is not naturally injurious to health, but becomes injurious by reason of the mode in which it is carried on. Illustrations from each of these classes have been given in my former reports; and during the past year further illustrations of both have been gathered.

Workers  
in Lead and  
Mercury.

(i.) As regards the first class of work—the work which *naturally* endangers health,—the inquiries previously made and reported on have related to mining of all sorts, and to the various dust-producing in-door industries, and to the industries concerned respectively with phosphorus and with arsenic-green;—and now, in continuation, my Lords have had inquiry made by Dr. Whitley into the industries which have to do with LEAD, and into the industries which have to do with MERCURY.

It has long been well known that any person, whose employment brings him into much habitual relation with either of these metals, is liable to a process of slow poisoning; which in its earlier stages seldom (except with extreme neglect) proves dangerous to life; but which, if the employment be persevered in, is apt with time to get faster and faster hold of the body, and at last to cause irreparable disease, usually in some part of the nervous system. Therefore, in their Lordships' investigation, it was a primary object to ascertain as far as possible to what extent lead-poisoning and mercury-poisoning now arise among persons who have most to do with these metals respectively. But unfortunately (for reasons which are set forth in Dr. Whitley's report) full and precise information on this subject could not be got. And any statements which can be founded on my present evidence must be qualified by two considerations;—first, that statistics were never obtainable as to the real pressure of disease on persons employed in the more dangerous branches of the industry; and, secondly, that in all probability the establishments which were visited were very favourable

specimens of this class. With these qualifications, the main facts of the case are, I believe, as follows:

Workers  
in Lead and  
Mercury.

a.) As regard LEAD,—it seems to be recognized that among operatives who have to do with it only in minor degrees or under mitigating circumstances (as, for instance, among glass-makers, enamellers, shot-makers, printers, and typefounders) poisoning, sufficiently severe \* to attract notice, is now rare, except for persons of intemperate and uncleanly habits.† Even with plumbers and painters it is not, except by their own fault, much more frequent. In the larger lead industries—the *manufacture of white lead*, and the *manufacture of sugar of lead*, the danger is evidently too great to be entirely within control of personal cleanliness, and perhaps too great to be in any way altogether remediable, while the present processes of manufacture continue. But one of those industries—the manufacture of sugar of lead, is little, if at all, followed in England. And respecting the other (though Dr. Whitley could not get any very exact information on the subject) it seems probable that, except with personal carelessness, damage to life is not often great; that, for all the operatives, scrupulous personal cleanliness greatly diminishes the danger; and that even the most endangered persons—those, namely, whose employment lies in an atmosphere containing considerable quantities of lead-dust, and who get poisoned rather through their mouth than through their skin, might, by the special precaution of using respirators, avert much, perhaps nearly all, of whatever suffering now results from their occupation. Universally

\* It deserves notice, that among the less prominent effects of chronic lead-poisoning a peculiar liability to *gout* has to be counted. Dr. Garrod's valuable observations, establishing this fact, are not hitherto so commonly known as to have led to any publications of experience with regard to the prevalence of gout among classes of artisans. Nor did Dr. Whitley obtain any important information on the subject. But in the Appendix it will be seen that Printers, who now most rarely (if ever) suffer from either lead-colic or lead-palsy, are reported by Dr. Smith to speak of gout as comparatively frequent among them.—J.S.

† I am not able to say whether intemperance has any direct influence in promoting empoisonment by lead, or only acquires the reputation of that influence through the frequency with which it implies careless and uncleanly habits of life.—J.S.



Workers  
in Lead and  
Mercury.

it is alleged that progress has been made in diminishing the dangers of the occupation,—progress both in improving the ventilation of workplaces, and in the adoption of personal cleanliness by workpeople; and that, as the result, there has been a great diminution of lead-disease. But in my opinion it deserves more particular consideration than it has yet received, whether the processes which diffuse lead-dust, and which occasion the chief danger of this industry, are not processes which ought to be discontinued or modified.

b.) The industries which have much to do with MERCURY are in this country happily but two,—the business of so-called *water-gilding* (a business which tends to be superseded by the innocuous process of electro-plating, and which fortunately even now exists but in small amount) and the far larger business of *mirror-silvering*. In both these industries, but especially in the first-mentioned of them, serious danger to health is, I fear inevitably, involved. But the degree of danger varies, with an unusually extensive range, according to special sanitary circumstances,—becoming enormous when the occupation is pursued in confined ill-ventilated spaces, and when the workpeople neglect personal cleanliness, but under opposite circumstances becoming at least comparatively small. In view of this fact, it is important to observe that water-gilding and mirror-silvering are not carried on exclusively in such large establishments as were visited by their Lordships' inspector, but are to some extent carried on in ordinary dwelling-houses, where, doubtless, if they could be visited, the worst results of mercurial industry might be found.

Both these metallic industries are, in their hygienic relations, generally comparable to the arsenic-industry of which I spoke in my last report. And the same sort of regulation as I suggested to be desirable for that industry would in my opinion be desirable for these;—viz., that employers should be bound to provide all practicable arrangements for lessening danger to their workpeople, and should be prohibited from employing any person who presents, even in ever so small a degree, any sign of the characteristic metallic poisoning.

(ii.) As regards the second class of industries, the illustrations which stand in my former reports were gathered from the most varied industrial fields;—from the lives of straw-plaiters, lace-makers, and glovers at Berkhamstead, Tring, Towcester, Newport Pagnell, Nottingham, Radford, Basford and Yeovil; from the lives of watch-makers at Coventry; from the lives of button-makers, jewellers and various knick-knack-makers, at Birmingham and Sheffield; from the lives of stocking-makers, especially such of them as work with the old knitting-frames, at Leicester, Nottingham, Radford, Basford and Hinckley; from the lives of pottery-artisans, especially of the decorators of earthenware, at Stoke and Wolstanton; from the lives of factory operatives employed on cotton, silk, flax, and wool, at Preston, Leeds, Bradford, Pateley Bridge, Macclesfield, Leek, Stroud, Melksham, Coventry and Blackburn, and of operatives, not under the Factory Act, employed at some of these places in particular branches of the same industries.

And the concurrent testimony of these most various illustrations is,—that commonly, when many persons are employed together at any in-door industry, the ventilation of the workplace is likely to be so bad as to convert the employment, which perhaps in its own nature is not of hurtful tendency into an employment seriously dangerous to health. Here (as I anticipated in my report of 1858) lies the explanation of a fact most deplorable for the working classes of our country,—that, *in proportion as the people of a district are attracted to any collective in-door occupation, in such proportion, other things being equal, the district death-rate by lung-diseases will be increased*. For the bad ventilation which, as a rule, belongs to the place of employment, tends to develop among the workpeople a large excess of phthisis, and probably also some excess of other fatal lung-disease. And probably in all England there is no exception to the rule, that, in every district which has a large in-door industry, the increased mortality of the workpeople is such as to color the death-return of the whole district with a marked excess of lung-disease. The mortuary statistics, recently laid before Parliament, place this matter in a singularly striking light. In those returns, for instance, it may be seen, that while

Indoor  
Workers  
generally.



Indoor  
Workers  
generally.

about 100 deaths by phthisis and other lung-diseases are occurring in various agricultural districts of England among men aged from 15 to 55, there occur, on similar masses of population, in Coventry 163 such deaths, in Blackburn and Skipton 167, in Congleton and Bradford 168, in Leicester 171, in Leek 182, in Macclesfield 184, in Bolton 190, in Nottingham 192, in Rochdale 193, in Derby 198, in Salford and Ashton-under-Lyme 203, in Leeds 218, in Preston 220, and in Manchester 263\*. The same sort of evidence comes out even more strongly, when (as in the annexed table) the statistics are limited to the decenniad of adolescence, and are so given, that, with regard to districts where only one sex pursues in-door industry, the death-rates of the sexes may be compared. There, for instance, it is seen,—and not any one who knows the circumstances under which girls are employed in lace-making and straw-plaiting can wonder at the fact,—that among the adolescent population of Berkhamstead, Newport Pagnell, Towcester and Leighton Buzzard, the female victims of lung-disease are more than twice as numerous as the male. And there again, in the death-rates of Leek,

District.	Nature of principal Industry pursued in the District.	Death-rates, by Phthisis and other lung-diseases, at between 15 and 25 years of age, per 100,000 of each class referred to.	
		Male.	Female.
BERKHAMPSTEAD -	Extensive female employment in straw-plaiting -	219	578
LEIGHTON BUZZARD -		309	554
NEWPORT PAGNELL -	Extensive female employment in lace-making -	301	617
TOWCESTER -		239	577
YEOVIL -	Extensive female, with some male, employment in glove-making -	280	409
LEEK -	Extensive employment, more female than male, in silk work -	437	856
CONGLETON -		566	790
MACCLESFIELD -		593	890
Standard Northern Districts -	Agriculture -	331	333

\* In many of these districts, the local industry is to some extent injurious, as one which obliges certain operatives to breathe a dusty atmosphere. But none are such extreme illustrations of that influence as to effect the present applicability of the table.—J.S.

Congleton, and Macclesfield, the same sort of sad testimony is borne (but not exclusively by the female population) as to the atrocious sanitary circumstances under which much of our silk-industry is conducted.

Indoor  
Workers  
generally.

Thus far, with regard to the indoor-industries which were investigated in 1860 and 1861, and with regard to the new statistical evidence now given as to the unwholesomeness of the circumstances under which those industries are followed. The inquiries of 1863, ordered by my Lords in continuation of the above, related to the sanitary circumstances of three very large London industries,—that of female *dress-makers*, including in this term not only dress-makers, technically so called, but also milliners and various other workers at articles of dress,—that of *tailors*,—and that of printers. The inquiry concerning dress-makers was made by Dr. Ord, the other two inquiries by Dr. Edward Smith.

From these inquiries it appears certain that as regards the ill-ventilatedness of workplaces, the three investigated industries are no exception to the general rule of in-door employment,—that they even furnish in this respect some of the most pitiable illustrations which can be conceived of the cruel sanitary circumstances under which bread may have to be earned.

Probably no industry which has yet been investigated has afforded a worse picture than that which Dr. Smith gives of tailoring:—"Shops vary much in their sanitary conditions, " but almost universally are over-crowded and ill-ventilated, " and in a high degree unfavourable to health. Some are " found underground, either in the basement of a house, or " built like a large kennel in a small enclosed yard, and are " such that no domestic servant would inhabit. A very few " have been built as workshops for this or some other occupation, and have large rooms, with an abundance of " windows. Some consist of a whole house, with the walls " on each floor removed, a well staircase occupying the centre, " and skylights placed in the roof of the upper room. Others " are simply rooms on the upper floors of the premises, and " others, still, are single rooms, built in the rear of the " premises, and lighted and ventilated from the roof only.

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" In exceedingly few shops have there been any attempts at  
" ventilation, except through the windows placed at the sides  
" or in the roof; but in some, air-bricks have been inserted  
" into the wall, or a tube, with perforated zinc placed in it  
" upper edge, and communicating by the end with the outer  
" air, passes through the room, or tubes of various kinds pass  
" perpendicularly from the floor to the roof. The ventilation  
" through the windows is practically inefficient, since when  
" it occurs only through a moderate opening in the skylights,  
" and the doors are kept shut, the interchange of air is but  
" small, and when through a large opening in the skylight,  
" or through side windows placed near the operatives, the  
" draught cannot be borne, and some of the operatives in-  
" sist upon them being kept shut. Such rooms are neces-  
" sarily warm; but when the gas is lit, as during the day-  
" time in foggy days, and at night during the winter, the  
" heat increases to 80° and even to upwards of 90°, causing  
" profuse perspiration, and condensation of vapour upon the  
" panes of glass, so that it runs down in streams or drops  
" from the roof, and the operatives are compelled to keep  
" some windows open, at whatever risk to themselves of taking  
" cold." And he gives the following account of what he found  
in 16 of the most important West End shops:—"The largest  
" cubic space in these ill-ventilated rooms allowed to each  
" operative and the gaslight is 270 feet, and the least 105 feet,  
" and in the whole average only 156 feet per man. In one  
" room, with a gallery running round it, and lighted only from  
" the roof, from 92 to upwards of 100 men are employed, where  
" a large number of gaslights burn, and where the urinals  
" are in the closest proximity, the cubic space does not exceed  
" 150 feet per man. In another room, which can only be  
" called a kennel in a yard, lighted from the roof, and ven-  
" tilated by a small skylight opening, five to six men work  
" in a space of 112 cubic feet per man. Such a state is, so  
" far as my inquiries have yet extended, without parallel  
" in workshops in other trades."

The state of compositors in printing offices is not commonly  
so bad as this; nor, still less, that of other printers. And  
especially I must state that often the master printers have

taken pains to amend the ventilation of their workrooms. But from various circumstances the ventilation, even where it  
has been best devised, is almost invariably unsuccessful;—  
often because the building is so constructed as to be quite un-  
fit for any large industrial use,—often because the ventilators  
are so arranged that the compositors are unable to bear the  
draught of cold air which comes from them,—often because  
they are inadequate to the great heat and foulness which  
begin when the gas-jets are lit. Thus, says Dr. Smith, "in  
" one room, with many large ventilators, in which 90 men  
" work, and 167 gaslights burn, the heat becomes almost  
" insufferable. . . . The effect of introducing the ventilators  
" has, however, been to lessen the moisture of the air, so that  
" streams of fluid no longer run down the windows or fall  
" from the skylight, and the air has lost its murkiness,  
" even when all the gaslights are in operation . . . . It not  
" infrequently happens that fumes from a foundry, or foul  
" odours from machinery or sinks, rise from the lower room,  
" and aggravate the evils of the upper one. The heated air of  
" the lower rooms always tends to heat the upper by warming  
" the floor, and when the rooms are low, and the consumption  
" of gas great, this is a serious evil, and one only surpassed  
" in the case where the steam boilers are placed in the lower  
" room, and supply unwished-for heat to the whole house  
" . . . . As a general expression, it may be stated that  
" universally the ventilation is defective, and quite insufficient  
" to remove the heat and the products of the combustion of  
" gas in the evening and during the night, and that in many  
" offices, and particularly in those made from dwelling-  
" houses, the condition is most deplorable. This is partly due  
" to the difficulties of the case, and partly to the determina-  
" tion of the compositor to prevent ventilation. At the same  
" time it must be added that both employer and employed  
" are fully alive to the magnitude of the evil, and wait for  
" science to devise plans whereby good ventilation may be  
" effected under diverse conditions, and in all cases without  
" causing a perceptible draught."

Dress-makers apparently do not, on the whole, suffer so  
much as printers, nor nearly so much as tailors, from the

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crowding and ill-ventilation of workrooms;—but the details which are given in Dr. Ord's report show that to a considerable extent (and of course chiefly in establishments of low grade in the industry) the atmosphere in which dress-makers work is, at least during the hours of artificial lighting, overheated, foul, and unwholesome. Thus for instance, in 34 dress-making establishments (not of the class worked by middle men) Dr. Ord found that the average allowance of cubic feet to each worker was only in four cases more than 500, in four other cases from 400 to 500, in five others from 300 to 400, in five others from 250 to 300, in seven others from 200 to 250, in four others from 150 to 200, and in nine others only from 100 to 150. The largest of these allowances would but be scanty for continuous work, unless the space were thoroughly well ventilated; and, except with extraordinary ventilation, its atmosphere could not be tolerably wholesome during gaslight. The ventilation, however, says Dr. Ord, is as follows:—"In some of the large houses ventilation by special apparatus is carefully attended to; but in the commoner workrooms ventilation is certainly disregarded, and it is not uncommonly found that ventilators, even when provided, are obstructed either wilfully or of neglect. For instance, in one room, occupied by 25 persons, with 150 cubic feet of space for each, and nine gas-jets burning, I found that four ventilators were provided, two, namely, opening into the chimney, and two in the windows. Three of these were useless, one of the window ventilators having a sheet of paper pasted over it, and the two chimney ventilators being immovable. The air of the room was very close and unwholesome; but I was informed that the girls sitting near the windows could not bear the draught, and had therefore stopped up the ventilator. Sitting for many hours without exercise in warm rooms, the girls naturally become extremely sensitive to currents of air, and, in consequence, such obstructions of ventilators are not uncommon. In a low confined room, containing upwards of 30 persons, where ventilating tubes were placed over the gas burners to carry off the products of combustion, I found three tubes out of four purposely blocked up. Even with good ventila-

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tion the workrooms tend to become very hot and close at night on account of the number of gas-jets required for the proper lighting up of the work. Where the cubical space for each person is 200 or 250 feet, where a large gas light is provided for every three or four persons, and where the ready access of fresh air is not provided for, the atmosphere becomes very unwholesome. Much illness and deterioration of health among the workers may, in my opinion, be referred to such conditions." And here is Dr. Ord's note concerning an establishment which he visited of the lower or middle-man's class;—"One room, area in cubical feet, 1,280; persons present, 14; area to each, in cubical feet, 91.5. The women here were weary-looking and squalid; their earnings were stated to be 7s. to 15s. a week, and their tea. The hand who earned only 7s. was young and inexperienced. Hours 8 a.m. to 8 p.m. The small room into which these 14 persons were crowded was ill ventilated. There were two moveable windows and a fireplace, but the latter was blocked up, and there was no special ventilation of any kind. This house, in which comfort and health were alike ignored, displayed most painfully the evils to which the servants of poor employers are subject."

But this is not all. Besides the sanitary faults of workplaces which the above extracts may illustrate, overwork prevails in all the three industries,—overwork which is systematic, not occasional,—overwork which, with rare exceptions, pervades each industry more or less as its rule,—overwork which, even if the workplace were well ventilated, would of itself suffice to breed disease.

Tailors, in those atrocious workshops which Dr. Smith describes, work generally for about 12 or 13 hours a day, and at some times the work will be continued for 15 or 16 hours. Printers on weekly averages of their labour would be found to spend fewer hours in the workroom;—but their labour is, in very large proportion, night-work, which often is irregularly combined with day-work;—and in some offices (especially those of weekly newspapers) there will be work—work too, in which boys between 12 and 16 years of age take equal part—for almost uninterrupted periods of two days and a night at a



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time;—while, in other printing offices, which lay themselves out for the doing of “urgent” business, Sunday gives no relaxation to the workman, and his working-days become seven instead of six in every week. The overwork of young women in fashionable dressmaking establishments does not, for more than about four months of the year, prevail in that monstrous degree which has on many occasions excited momentary public surprise and indignation; but for the in-door hands during these months it will, as a rule, be of full 14 hours a day, and will, when there is pressure, be, for days together, of 17 or even 18 hours. At other times of the year the work of the in-door hands ranges probably from 10 to 14 hours; and uniformly the hours for out-door hands are 12 or 13. For mantle-makers, collar-makers, shirt-makers, and various other classes of needle-workers (including persons who work at the sewing-machine) the hours spent in the common workroom are fewer—generally not more than 10 to 12 hours; but, says Dr. Ord, the regular hours of work are “subject to considerable extension in certain houses at certain times, by the practice of working extra hours for extra pay, and in other houses by the practice of taking work away from houses of business, to be done after hours at home; both practices being, it may be added, often compulsory.”\*

\* Mr. Radcliffe, of Guildford Street, the Honorary Secretary of the Epidemiological Society, has been kind enough to furnish me with some notes and observations of his own relating to milliners and dressmakers employed in first-class houses of business. Happening to have unusual opportunities for questioning the young women when away from business and from the influence of their employers, he has made in a limited number of instances most careful and minute inquiry into the real state of health of girls who called themselves “quite well,” and who might be regarded as fairly representative of their class. The result was that in only one out of twenty girls examined could the state of health be pronounced good; the rest exhibiting in various degrees evidences of depressed physical power, nervous exhaustion, and numerous functional disorders thereupon dependent. He attributes these conditions in the first place to the length of the hours of work—the minimum of which he estimates at 12 hours a day out of the season; and secondarily to less universally existing causes,—such as crowding and bad ventilation of workrooms, gas-vapours, insufficiency or bad quality of food, and inattention to domestic comfort. He insists very much on the ill effects of neglect of domestic comfort,—as in bad cooking of food, monotony of diet, careless or dirty serving of food, scant furnishing of bedrooms, insufficient supply of water, and of accommodation for personal cleanliness, want of arrangements for useful employment of leisure, &c. For remedies,

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While deeming it my duty to bring prominently forward for consideration these facts which the recent inquiry has made known to their Lordships with regard to the overwork of certain large classes of operatives, I do not in any degree contend, that, in our present social circumstances, the overwork of adult men is a matter for legislative interference. I am aware that, in the judgment of present society, such interference would be beyond the proper province of law,—would be dealing with evils which in the long run will best right themselves without legislature. But that younger persons ought to be protected against extortionate and merciless taskmasters or parents,—that even adult women, at least when collectively employed, ought also to be fenced round with such imperfect protection as law can give them against overwork,—has in principle been affirmed by the legislature. And it may be that, in accordance with the precedents thus already established, some of the cases which I have now brought forward will be deemed fit to be dealt with by law.

But even more than for the overwork itself, it is for the attendant circumstances of the labour, that now, as in former reports, I would venture to claim particular attention.

In my Fourth Annual Report I showed how practically impossible it is for workpeople to insist upon that which in theory is their first sanitary right,—the right that whatever work their employer assembles them to do, shall, so far as depends upon him, be, at his cost, divested of all needlessly

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diseases.

apart from legislative interference, he looks chiefly to publicity; the good effects of which he finds illustrated in the improvements which followed the publication of Mr. Grainger's report. But he points out that the more advanced of the workers, those who in time will become employers, are so accustomed to the existing system, that even if they be not indifferent to its evils, there is little probability that they would, when they possess the power, modify the system to the extent required. And for this, which he holds to be a chief obstacle to thorough measures of amelioration, he believes that a higher grade of education would be the remedy. He would wish to see provided for young women engaged in trade the same facilities for education as are now provided so freely in the metropolis for young men; and he is of opinion that the excellent “Homes” now existing in London might be the best machinery for bringing that remedy into application.—J.S.



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unwholesome circumstances; and I pointed out that, while workpeople are practically unable to exact that sanitary justice for themselves, they also (notwithstanding the presumed intentions of the law) cannot expect any effectual assistance from the appointed administrators of the Nuisances Removal Acts. In the two years which have elapsed since the making of that fourth report, my information on the industries of England has necessarily been increased and extended. And now, with this bettered information, I beg leave to express my opinion that the whole large question of the sanitary circumstances of labour demands very urgently the consideration of the legislature.

So far as printers, tailors, and dressmakers are concerned, the appendices of my present report contain evidence which will, I think, be deemed sufficient to justify the opinion which I express. And lest the urgency of their case should be undervalued, I here insert a table (for the figures in which I am indebted to the Registrar General) showing the ex-

Number of Persons of all ages employed in the industries respectively.	Industries to be compared as to their effects on health.	Death-rates per 100,000 men employed in the respective industries at the undermentioned ages.		
		25-35.	35-45.	45-55.
958,265	{ Agriculture throughout England and Wales }	743	805	1,145
22,301 men 12,377 women	{ London tailors }	958	1,262	2,093
13,803	London printers	894	1,747	2,367

N.B.—It is probable that at the age of 25-35 the mortality of tailors and printers in London is greater than that represented in the first of the above columns of figures. For in both industries, London employers receive from the country large numbers of youths and young adults (probably up to 30 years of age) as apprentices and "improvers." These young men are of course counted in the census as London tailors and London printers respectively. But while their presence thus swells the number of hands on which the London industrial death-rates have to be reckoned, it probably does not contribute in anything like the same proportion to the number of deaths in London. For the stay of those young men in London is, under any circumstances, only meant to be temporary; and if, during this time, they are attacked in London by serious chronic disease (such as phthisis) they probably return to their country homes, where, if they die, their deaths would be registered.

This influence affects still more the earlier ages, and renders the London death-rates for those ages quite valueless as measures of the industrial insalubrity. For instance, the death-rate of London tailors at the age 20-25 is represented to be less than that of the agricultural population of the same age, the former being only 715, while the latter is 762. But the fallacy of this representation is seen as soon as we look at the death-rate of tailors at the same age in England and Wales generally, which is 1,113. Similarly, the death-rate of printers generally at the age of 20-25 is 949, while the fallacious death-rate of the London printers at that age is only 693.

sive mortality of London printers and London tailors as compared with the healthy standard of agricultural industry. I have no such statistics with regard to dressmakers; nor can I, as regards any special industry, give death-rates calculated (like the district death-rates in the last preceding table) for the one particular fatality of lung-disease. But Dr. Smith's report tells, both for printers and for tailors, that phthisis and other lung-diseases are notoriously in vast excess. He finds reason to believe that, among the printers of London, phthisis, in proportion to other diseases, is twice as prevalent as even among the general male population of London. He finds also that among tailors "consumption and other forms of chest disease constitute two-thirds of all the causes of death." And the annexed table shows the effect of those diseases in swelling the general death-rate of each occupation. It will be seen that, at the age of 35-45, the mortality of London tailors is 57 per cent. higher, and the mortality of London printers more than 117 per cent. higher, than that of the male agricultural population. It also shows that, at the age of 45-55, the London tailors have nearly twice, and the London printers more than twice, the mortality of the agriculturists.

In support of the same opinion with regard to other industries, I would refer to the detailed evidence given in my third, fourth, and fifth reports, and to the overwhelming statistical evidence which has recently been laid before Parliament. Especially I would advert again to the statistics which I have already quoted, with regard to the prevalence of pulmonary disease at our principal seats of textile industry, and in our straw-plaiting, glove-making, hosiery, and lace-making districts. And in further illustration of the case I would submit the annexed table, showing to how deplorable an extent various other industries tend to destroy their workpeople by chronic lung-disease (here usually not phthisical, but irritative and inflammatory) which breaks them down in what should be their prime of life. By this table, namely, the fact is shown that, in the districts where miners and metal-forgers and cutlers and potters follow their respective industries, the death-rate, by lung-disease, of men aged from 45 to 65 is

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Mortality from industrial diseases.

from  $2\frac{1}{2}$  to 8 times as high as in healthy agricultural districts.

These arguments, taken together, will, I trust, establish my position. Doubtless there may be some small technical difficulty in defining the exact line at which employers shall become subject to regulation. But I would submit that, in principle, the sanitary claim is universal. And in the interests of myriads of labouring men and women, whose lives are now needlessly afflicted and shortened by the infinite physical suffering which their mere employment engenders, I would venture to express my hope, that universally the sanitary circumstances of labour may, at least so far, be brought within appropriate provisions of law, as that the effective ventilation of all in-door workplaces may be ensured, and that in every naturally insalubrious occupation the specific health-endangering influence may as far as practicable be reduced.

Deaths per 100,000 by phthisis and other diseases of the lungs.			Mean of the Two Columns, reduced, for Facility of Comparison, to the Scale of the Standard group, taken as 100.
	Men aged 45-55.	Men aged 55-65.	
REDRUTH - -	1,499	2,360	482 $\frac{3}{8}$
PENZANCE -	975	1,157	266 $\frac{1}{2}$
WOLSTANTON -	1,173	1,811	373
STOKE-ON-TRENT -	1,309	1,787	387
WOLVERHAMPTON -	763	1,430	274
BIRMINGHAM -	1,169	1,907	384 $\frac{1}{3}$
ASTON - -	697	1,290	248 $\frac{3}{8}$
SHEFFIELD - -	1,205	1,912	389 $\frac{5}{8}$
REETH - -	1,391	3,214	575 $\frac{5}{8}$
ALSTON - -	2,069	4,400	808 $\frac{5}{8}$
ABERGAVENNY -	628	1,305	241 $\frac{5}{8}$
MERTHYR TYDFIL -	898	1,582	310
Standard Northern Districts - -	322	477	100

Residence in Marsh-districts.

Ague, &c.

### 3. Residence in Marsh-districts.

#### (i.) As regards Ague and other Malarious Diseases.

Till a comparatively late period in the history of this country, there were vast tracts of marsh-land which could not, without much detriment to health, be inhabited. Of course in England marsh-malaria never obtained that desperate malignity which it has in tropical climates. Nor probably was it ever even nearly so fatal as in the southern parts

of Europe; where, through its operation, fevers of perilous Ague, &c. kinds and very severe dysentery are habitual and general dangers to life; and where even yellow fever, if its infection be introduced, finds a congenial soil for its development. But, though of less formidable intensity here than in those hotter climates, marsh-malaria was a great morbid influence in England. Even in London, till that better draining and paving which after the great fire attended the re-construction of the City, ague used to be among the most prevalent and most fatal of diseases; and now not a century has passed, since it still used to have considerable prevalence in London.\* At present, in London proper, it is unknown as an endemic disease. In other parts of England, its cessation has been far slower and less complete. True, that by the Registrar-General's reports it appears as causing in all England only from 140 to 240 deaths per annum. But, if one may judge by the records of the Peterborough hospital, where out of nearly 4,000 malarious cases, treated during the last 14 years, only one has proved fatal,—even 140 to 240 annual deaths would represent a very extensive (though not severe) prevalence of the disease. And, moreover, almost certainly those registered deaths from ague are not nearly all the

\* With regard to agues, says Sir Gilbert Blane, in his dissertation on the comparative prevalence and mortality of different diseases in London, "we learn from Dr. Caius or Keye, the most eminent physician in England of that age, that the mortality from agues in London in the year 1558 was such, that the living could hardly bury the dead. And Bishop Burnet, in his history of the Reformation, speaking of the same year, says, 'intermitting fevers were so universal and contagious, that they raged like a plague.' In the next century, we learn from Sydenham and Morton, that intermittent fever was one of the most prevalent and fatal disorders in London from 1641 to 1665, and that for some years afterwards this complaint was very rare. This was probably owing to the great dryness of the streets, effected by draining, when the city was rebuilt after the great fire of 1666. We are told, however, by Sydenham, that these fevers revived before the end of the century, and were epidemic from 1677 to 1685. They prevailed a good deal during the first part of the eighteenth century. The number of deaths reported in the bills in 1728 is 44; in 1729, 47; in 1730, 16; they then greatly declined; but, we learn from a work of Dr. Fothergill, that they returned in an endemic form in the years 1751, 1753, and 1754. For more than 30 years past from the date of writing this [1813] according to my own observation, and the best information I can gather from others, this disease has not been known as an endemic in this metropolis."—J.S.

Ague, &c.

deaths which marsh-disease has occasioned;—for when marsh-malaria destroys life in this climate, almost always it is by secondary, not by primary effects; and the deaths which thus occur are apt to be registered, not as ague-deaths, but as deaths from dropsy, or from liver-disease, or from other abdominal affection.

In 1863 the Lords of the Council thought it desirable to inquire to what extent marsh-disease now ordinarily prevails in the districts which have had the reputation of breeding it. And for the purpose of this inquiry, I under their Lordships' directions instructed Dr. Whitley to visit the principal marsh-districts of England, and to investigate their sanitary state.

The report[A] made by Dr. Whitley is in the main very satisfactory. It records, as regards England generally, that "the diseases which have been made the subject of the present inquiry have been steadily decreasing both in frequency and severity for several years, and this decrease is attributed in very nearly every case mainly to one cause, improved land drainage." Partial exceptions are here and there to be found to this rule of general improvement. Districts where apparently there has not been in late times much or any lessening of malarious influences, and where consequently all, or nearly all, the improvement has yet to be made, are Huntspill and the marshes on the banks of the river Swale." And, as might be expected from the nature of the case, instances are more numerous where, though improvement has been made, room, even much room, still remains for improvement. Such particularly are the districts of Sheppey, Hoo, Spalding, Hull, New Romney, and Lewes.

Having regard to the serious evil which malaria is in any district, and especially to the harm which in such districts it inflicts on the poorer parts of the agricultural population, I hope that its complete extinction from among us may not be unnecessarily delayed, but that in both classes of districts to which I have referred, and of course peculiarly in the first-mentioned one, the landowners and local authorities will speedily give the furthest proper extension and the fullest

possible effect to that system of thorough land-drainage which has already done so much for improving the health of the country.

(ii.) *As regards the Mortality of Infants.*

After the completion of the above-described general inquiry into the sanitary state of the marsh-districts of England, a partial further inquiry was necessary with regard to the very curious fact (now first made known to their Lordships) that, in some entirely rural marsh-districts, the habitual mortality of young children is almost as great as in the most infanticidal of our factory-towns;—that Wisbeach, for instance, is within a fraction as bad as Manchester;—and that, generally, in the registration districts of Wayland, Thorne, Mutford, Guiltcross, Walsingham, Goole, Spalding, Ely, Docking, Howden, King's Lynn, North Witchford, Yarmouth, Downham, Holbeach, Norwich, Whittlesey, and Hoo, as well as in Wisbeach, the death-rate of infants under one year of age is from  $2\frac{1}{4}$  to nearly 3 times as high as in the sixteen districts of England which have the lowest infantile mortality.

Under their Lordships' orders, I instructed Dr. Hunter to inquire into the meaning of this unexpected fact. And now, before adverting to the explanations which he has found for it, and which his report fully sets forth, it will be convenient to refer more precisely than I have yet done to the great differences which there are of infantine death-rate in different parts of England, and to the explanations hitherto found for them.

There are in England 16 registration districts, which have, as their mean annual death-rate for infants under one year of age, but 9,085 deaths per 100,000 living; and in one of these districts the death-rate is as low as 7,047. There are 24 districts where the death-rate, though over 10,000, is under 11,000,—39 where, though over 11,000, it is under 12,000,—and 48 where, though over 12,000, it is under 13,000. On the other hand, in 22 districts\* it exceeds 20,000. In 25

\* Westminster, Holborn, St. George, Ampthill, Leighton Buzzard, Luton, Ipswich, Wayland, Docking, Plymouth, Bristol, Stourbridge, Leicester, Barrow-on-Soar, Basford, Halifax, Dewsbury, Thorne, York, Sculcoates, Sunderland, Abergavenny.—J.S.

Infantine mortality.



Infantine  
mortality.

more districts \* it exceeds 21,000. In 17 more districts † it exceeds 22,000. In 11 more districts ‡ it exceeds 23,000. Further, in Hoo, Wolverhampton, Ashton-under-Lyne and Preston it exceeds 24,000, and in Nottingham, Stockport and Bradford, exceeds 25,000; while in Wisbeach and Manchester respectively the death-rates are 26,001 and 26,125.

In my report of 1858 I had stated my belief that the wide differences of infantine death-rate which are to be found in different districts of England (differences which at that time could be but very imperfectly measured) are "due to the" varying prevalence of two local causes:—

"first, to *differences of degree in common sanitary defects* of residence; some places abounding more than others in the foul air and foul water of undrained, unpaved, unscavenged, unwashed, unlighted, unventilated, localities and houses;

"and secondly, to *occupational differences* among the inhabitants; there being certain large towns where women are greatly engaged in branches of industry away from home; where, consequently, the home is ill kept; where the children are little looked after; and where infants who should be at the breast are improperly fed or starved, or have their cries of hunger and distress quieted by those various fatal opiates which are in such request at the centres of our manufacturing industry."

In 1861 an inquiry was made into the second (hitherto the less investigated) of those two causes. It resulted in showing the very extensive and powerful operation of that influence in several of our greatest centres of manufacture. It showed, moreover, that while, with the described circumstances, infants perish under the neglect and mismanagement which their mothers' occupation implies, the mothers become to a grievous

\* Whitechapel, St. Saviour, St. Olave, Towcester, Northampton, Mutford, Guiltcross, Walsingham, Birmingham, Blaby, Hinckley, Loughborough, Spalding, Hayfield, Wigan, Leigh, Bury, Chorlton, Burnley, Keighley. Hunslet, Barnsley, Goole, Hull, Newcastle.—J.S.

† St. Giles, Biggleswade, Ely, North Witchford, Yarmouth, King's Lynn, Stoke-upon-Trent, Walsale, Dudley, Nuneaton, Macclesfield, Salford, Blackburn, Sheffield, Howden, Merthyr Tydfil, Crickhowell.—J.S.

‡ Whittlesey, Norwich, Downham, Wolstanton, Foleshill, Leicester, Holbeach, Radford, Bolton, Oldham, Leeds.—J.S.

extent denaturalized towards their offspring—commonly not troubling themselves much at the death, and even sometimes (it was believed) taking direct measures to ensure it. Now, as regards both classes of infanticidal influences to which I have referred, it had seemed that the great centres of the life-destruction must be in towns;—that in towns (or at least amid relatively dense gatherings of population) there would more commonly be found in excess, not only the filth which makes residence unwholesome, but also the collective employments which withdraw mothers from their home. The discovery that an enormous infantine mortality was prevailing in several purely agricultural districts suggested, at first sight, that perhaps in these districts some third sort of destructive influence was at work. And for the solution of this doubt Dr. Hunter's inquiry was ordered.

The result of this new inquiry, however, has been to show that the monstrous infantine death-rate of the examined agricultural districts depends only on the fact that there has been introduced into those districts the influence which has already been recognized as enormously fatal to the infants of manufacturing populations—the influence of the *employment of adult women*. "The opinions (says Dr. Hunter) of about 70 " medical practitioners, with those of other gentlemen acquainted with the condition of the poor, were obtained. " With wonderful accord the cause of the mortality was " traced by nearly all these well-qualified witnesses to the " bringing of the land under tillage, that is, to the cause " which has banished malaria, and has substituted a fertile " though unsightly garden for the winter marshes and " summer pastures of 50 or 100 years ago. It was generally " thought that the infants no longer received any injury " from soil, climate, or malarious influences, but that a more " fatal enemy had been introduced by the employment of the " mothers in the field." On this agricultural employment of women there follow identically the same results as have already been traced to result from the employment of women in manufacture. The mother, as soon as she can rise from her confinement, goes again to work, leaving, while she is away, her infant to anyone who will pretend to take care of it.

Infantine  
mortality.



Infantine  
mortality.

Instead of its natural food, entirely improper stuff is given it. "Cow's milk is dear, and often quite unattainable by these people, and sugar sop, a lumpy mass of bread, water, and sugar, is given instead. This is either given cold, or is left on the fire-hob in a cup, seldom or never changed or cleaned, whence the fermented and sooty mass is heaped into the infant's mouth by the nurse, who prefers this mess to cow's milk, under the notion that 'the two milks could never agree.'" But this is not the worst. "So-and-so has another baby;—you'll see it won't live," is the neighbourly view which Dr. Hunter finds to be taken of the predictability of certain events among these demoralized populations. And the predicted event soon comes,—perhaps through the normal operation of the diet which Dr. Hunter describes,—perhaps through the almost incredible cruelty of deliberate starvation,—perhaps through an intentional or unintentional over-dose of the opium which is universally employed.\* "A medical man is called to the wasting infant, 'because there is so much bother with registering.' The mother says the child is dying, and won't touch food. When *he* offers food, the child is ravenous, and 'fit to tear the spoon to pieces.' On some of the few occasions on which the surgeon in his disgust has insisted on opening the body, the stomach and bowels have been found quite empty. It was in many places reported that infant life had been saved in the midst of one of these wastings by the threats of a determined surgeon or neighbour. Where the coroners have been induced to support these attempts to save life; where inquiry has been made, and severe admonition, with an appearance of a chance of committal; also, where the registrar has pretended to refuse registration without medical certificate in families notorious for their loss of infants,—in these cases an amendment has taken place. It was more than once related, that women who had lost two or three successive children lost no more after it had been plainly signified to them that their proceedings were watched. Bad as is the starvation of infants, another practice is more common and more lethal; this is

\* Respecting the enormous general consumption of opium in these districts something will be said in another section of this report.—J.S.

"the drugging with opium. . . Cases of death from opium poisoning are supposed to be common; occasionally they are the subject of inquests; sometimes they are recorded as cases of 'overlying;' but the medical practitioners are of opinion that by far the most common end of such cases is the simple registration and burial as cases of '*Debility from birth, no medical attendant, Premature birth,*' and such like;—the public opinion of the neighbours seldom going beyond a sneer or sarcasm on the occurrence of a quarrel months or years after. So perfectly did the main body of medical practitioners agree in the opinion that 'ab lactation and narcotism' would be the true description of the cause of death of more than half the infants recorded, that a list of their names seems to be all that is necessary to be added." And Dr. Hunter adds the list of the 67 medical witnesses from whom the information was derived.

Even as compared with factory-labour, the female agricultural labour of the marsh-districts shows some very bad features. It is (as Dr. Hunter describes) often migratory,—the women often travelling in "gangs" under charge of an "undertaker," who contracts for them; and, under this system, neglect of infants must of course be as great as possible. The system, moreover, conduces to a vast quantity of reckless fornication. The proportion of illegitimate births is extraordinarily great. And perhaps the darkest shades of Dr. Hunter's picture are for cases where the infant's burthen-someness to its mother is increased by this complication of illegitimacy. The illegitimate births, he says, "frequently occur in the workhouse, and here, until the child is taken out, it thrives as well as others, but within a few weeks after their discharge the mother will go to the registrar, to inform him that her child is dead, and that it was always weakly, and never 'likely for life.' The lawful child fares little better when the mother belongs to a gang, or even does ordinary field work in her own parish. In the agricultural population it may be roundly stated that of the illegitimates one third die under a year old, of the others one fourth part. Then it must be remembered that in the latter class, who form nine tenths of the births, are found

Infantine  
mortality.

Infantine  
mortality.

"nearly all those of people whose comfortable circumstances allow them to give proper time to nursing their children."

In concluding this very sad recountal of evils, for which I cannot suggest any effectual remedy, I will observe that my knowledge of such evils may excuse the profound misgiving with which I regard any large industrial employment of adult women.

4. *Hospital Hygiene, especially in relation to the so-called traumatic infections, and to the spread of contagious fevers.*

Hospital  
Statistics and  
Hospital  
Hygiene.

Early in 1863, pursuant to the programme of sanitary investigation which I had sketched in my report of 1858, I submitted to the Lords of the Council that among the subjects which were now next claiming to be investigated was that of the influence of sanitary conditions on the curative efficiency of hospitals.

Besides the general reasons, suggested in 1858, for the making of such an inquiry, there had recently arisen a very striking illustration how much the inquiry was needed. The displacement of St. Thomas's Hospital from the site which it had for six centuries occupied at the south end of London Bridge gave rise very properly to much public discussion as to the rules by which the governors of that important charity ought to be guided in their choice of a new site for the hospital. And in the course of this discussion it became evident that the opinions expressed with regard to the relative importance of different sanitary circumstances in determining the salubrity of hospitals, were not directly deduced from a comparison of hospital experiences, but were inferences (right or wrong) from cases of supposed analogy, and that not on either side were there means for comparing in any useful way the success of one hospital with the success of another.\* It was indeed scarcely to be hoped that the results

\* I personally felt that, if the governors of the hospital had appealed to the Privy Council for information in the matter, I could not have submitted to their Lordships any credible existing documents on these subjects. And when it devolved upon me, as one of the surgeons of St. Thomas's, to take part with my colleagues in advising the governors whether town or country should be preferred

of any inquiry which their Lordships might order could be of public use with regard to the apparently almost settled question of the site of St. Thomas's Hospital. But whether the collectable evidence could or could not be made to assist public judgment in that particular question, the need for the inquiry in relation to future like questions which might arise was too evident to be resisted. And moved by these considerations, my Lords, at the beginning of the financial year, ordered that during the remaining nine months of 1863 there should be made, on as large a scale as the time would permit, a medical and surgical inquiry into the sanitary circumstances and results of British hospital practice.

The two gentlemen whom, under their Lordships' orders, I instructed to make the inquiry, were Dr. Bristowe, Physician to St. Thomas's Hospital (who had already made various sanitary inquiries for the department) and Mr. Holmes, Surgeon to the hospital for Sick Children, and assistant surgeon to St. George's Hospital. To these gentlemen the object of the inquiry was proposed in the following terms:—  
*"to ascertain the influence of different sanitary circumstances in determining in different hospitals (as compared with one another, and where practicable with private practice) more or less successful results for medical and surgical treatment;—particularly among patients who are submitted to surgical operations, or have undergone accidental injuries,*

for the new hospital-site, I could not import into our consultation any arguments but from analogy. The terms in which the physicians and surgeons (including myself) finally advised, were, as regards the said point, these:—"Supposing two otherwise thoroughly well conditioned hospitals—one in London, the other in the country,—some of us believe, while others of us do not believe, that, in the results of medical and surgical treatment, the country hospital would have an appreciable superiority of success. If, however, we in this respect for argument's sake adopted, as though it were unanimous, the most sanguine belief which any one of our number entertains, our practical conclusion [that St. Thomas's Hospital ought not to be moved into the country] would be unchanged:—for unanimously we should be of opinion, that the advantages of the country hospital would be purchased at far too dear a price, when, in obtaining them, the hospital must be made inaccessible to the sufferers who most urgently require it, and when the present system of professional attendance must be changed in essential particulars." To this expression of opinion were added some suggestions as to special arrangements which are suitable for convalescents and chronic invalids.—J.S.

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*"and among patients suffering from infectious fevers  
"and other kinds of acute disease, and among puerperal  
"women;—and with particular reference to the different  
"degrees in which recovery is delayed or prevented by  
"accidental morbid complications."*

For attainment of the object thus proposed to them, Dr. Bristowe and Mr. Holmes, or one of them acting for both visited in succession almost every considerable civil hospital in England and Scotland, and all the more important hospitals of Ireland. Receiving always kind co-operation and welcome from the authorities and officers of the hospitals which they visited, they endeavoured in each separate case to gather the fullest information which minute local inquiry and observation could elicit,—first, as to all sanitary circumstances of the hospital sick,—and secondly, as to the practical effect of the circumstances. Further, when these inspections were drawing to an end, the inquirers represented to me that the correctness of some of the conclusions to which they were tending could not well be tested, except by adverting to the experience of a hospital system differing very considerably from our own, and that, for the purpose of thus checking the results and increasing the trustworthiness of their report on British hospitals, they would wish to be authorized to collect some evidence with regard to the hospitals of Paris. My Lords having sanctioned this proposed supplemental inquiry, an inspection was made of the chief Parisian hospitals and of their records; and the very short time which could alone be afforded for its prosecution was rendered in effect sufficient, by official help, which I am bound gratefully to acknowledge, from M. Husson, the distinguished director of the department of public assistance in Paris, and from Messrs. Blondel and Ser, two of the sanitary officers of that department.

In submitting the report [A] which Dr. Bristowe and Mr. Holmes have made on the subject of their inquiry, I may permit myself to say, that in my opinion it gives a singularly comprehensive picture, and (so far as circumstances permit) a substantially just relative appreciation of the present hospital system of this country. It is true that, from causes entirely beyond the reporters' control, the report

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must be regarded rather as introductory than as final in its subject; for data could not be found for completely answering the pathological question which was proposed. In the vast majority of hospitals no scientific records were kept; and in the rare instances where reasonably good records were seen, these, as kept at different hospitals, were commonly so unlike one another, that no exact or minute comparison between them could be made. But though on this account the present report cannot be deemed exhaustive of its subject, and though especially there must remain for future inquiries many of the more subtle questions which the pathologist is anxious to see solved, yet, for practical purposes, the information now submitted will, I believe, importantly assist public judgment as to all broad rules of hospital hygiene.

In introduction to the report, I purpose here to say something as to the nature of the difficulties with which hospital managers have to contend, and as to the materials from which judgment may be formed concerning the skill with which that contest is conducted. From the nature of the case, my discussion of these subjects must be of an entirely technical character. In proceeding to it, I have to premise that, except where otherwise expressed, I speak only of general hospitals, and only of their in-patient practice.

I begin by interposing a caution—which is not, though perhaps it ought to be, superfluous, against one particular ambiguity of words in the discussion. What is the sense in which the word "healthy" may properly be applied to a hospital? In order that a hospital shall deserve to be called "healthy," we evidently do not require that its inmates shall be persons in health; for, to an establishment thus tenanted, the name "hospital" does not belong. Nor (it follows) do we require that the inmates of a hospital, as compared with corresponding numbers of healthy outside population, shall not suffer a high—even a very high—death-rate; for, since the hospital population is altogether a sick population, we expect that, in proportion to the gravity of the population's sickness, the hospital death-rate will exceed—perhaps, there-



fore, will very greatly exceed, the death-rate which, for a corresponding healthy population, would be normal. A "healthy" hospital is a hospital which does not, *by any fault of its own*, aggravate ever so little the sickness, nor oppose ever so little the recovery, of persons who are properly its inmates. And this, the only right sense of the absolute word, governs of course the word's comparative applications; so that, when we compare together two hospitals with regard to their "healthiness," and call one of them the "unhealthier" hospital, our meaning is, that in this hospital, by reason of some fault of its own, disease cannot be treated as successfully as in the other hospital. And the "fault of its own" through which an "unhealthy" hospital fails to attain the best possible results for its medical and surgical treatment, is of one of two kinds:—either it is an *inherent fault*, as of site or construction; or else it is *fault of keeping*, as dirtiness, or overcrowding, or neglect of ventilation.

Evidently it is of the utmost consequence that hospital authorities, for their own administrative guidance, should be able to compare together the results which their respective hospitals attain. How then may this be done?

Of all the various forms in which medical or surgical unsuccess may become evident, DEATH is the most unquestionable; and if proper materials existed for the purpose, hospitals might well be compared with each other, in regard of their respective quantities of that particular sort of unsuccess. But in order that such comparisons may be something better than mere arithmetical idleness, it is essential that there be no error as to the principle on which the death-rates are to be estimated. Death-rates calculated on *given magnitudes of illness* are (as far as they go) true measures of medical or surgical unsuccess. But a definite "magnitude of illness" is not necessarily represented by any given number of *patients* taken indiscriminately. Magnitude of illness (as regards the number of deaths which are likely to result) may be almost infinitely greater in one set of patients than in another equally numerous set;—e.g., among a hundred inmates of the Fever Hospital, I-lington, as compared with a hundred inmates of the Ophthalmic Hospital at Moorfields;—or among a hundred

patients having advanced phthisis, or advanced Bright's disease, as compared with a hundred patients having hysteria, or ringworm, or chronic rheumatism. And unless due regard be had to this vastly uncertain import of the word "patient," death-rates, calculated on mere numbers of so-called patients, must be utterly worthless as measures of hospital unsuccess.

This consideration is of very great importance as regards any use to be made of the so-called "general death-rates" of general hospitals.\* In the present state of knowledge it would be impossible that general death-rates should be calculated on exact estimates of the aggregate magnitude of illness treated in each hospital respectively. They may indeed be calculated on the other principle, calculated on the mere quantity, apart from the quality, of each particular hospital practice. But, when thus calculated, what pathological value can they have? For comparatively measuring hospital unsuccess, as against equal magnitudes of disease, they are utterly, even absurdly, inadmissible. Such could only be their meaning if it were first assumed that all the compared hospitals receive cases of equal (or not importantly unequal) gravity and dangerousness to life. But this assumption would be grossly inconsistent with facts. Hospitals, with regard to the quality of cases received in them for treatment, differ not triflingly, but enormously, from one another. Not only does it constantly happen that local circumstances tend to fill some hospitals rather than others with an excess of severe and dangerous cases, but different hospitals act on widely different principles as regards their reception of patients. While some charities recognise no other priority of claim to admission than that which consists in more severe and more urgent illness, while they evince noble pride and emulation in waging an ever precarious contest against the least conquerable forms of disease, and while they, thus competing with one another for the difficulties and dangers of

\* General death-rates are sometimes calculated on the *mean daily sick population* of a hospital; sometimes on the *aggregate number of cases treated*, during the year or other given time, *to a termination*. There are, I think, good reasons for preferring the latter mode. See note subjoined to the table at page 137.—J.S.



practice, have the dying and even the dead brought in numbers to their receiving rooms,\* and have their death-lists swollen by the many defeats which their more arduous practice involves,—defeats, however, against which there are corresponding victories and triumphs to be counted,—other hospitals pursue so different a course that their death-rates may well be low. Let the generous system which is followed at our chief urban hospitals, our great schools of medicine and surgery, or let the even better system which is followed at the hospitals of Paris, be compared with such a picture as that which the reporters draw of the system of our English rural hospitals:—"The functions which in Paris are exercised by " the hospitals in the treatment of acute disease are dis- " charged in the country districts of England by the medical " officers of the poor law unions, and of the clubs, and the " hospitals are reserved for the chronic cases. In many " country hospitals the beds are taken for some time before- " hand; in many the subscribers would not think they ob- " tained fair value for their subscription unless their nominee " was admitted, however little prospect there might be of his " receiving more benefit by treatment at the hospital than at " home; and not only admitted, but kept for the full 'term,' " as it is called, that is to say, the time during which a letter " is good.† The consequence is, and must be, that the " hospital is looked upon amongst the poor as a private " charity, as far as *disease* is concerned, and admission into it " is sought through private channels, just as into an alms- " house; in fact these country hospitals have become in great " measure sick clubs, in which the employer pays instead of " the patient. *Accidents* are known to be freely received,

\* E.g.—at St. Bartholomew's Hospital in 1863, 94 patients died within a day after admission, and 26 were brought dead to the hospital. The total deaths of the year were 557.—J.S.

† "This is usually either six weeks or two months. After that time the patient, if he is to stay, requires another letter. . . A curious illustration of the effect of the letter system upon the supply of patients is furnished by one of the hospitals which we have visited, where the hospital is moderately full while the governors have a good stock of letters, but becomes half empty at the season of the year when their stocks of letters are becoming low. This shows how little the practice of such hospitals corresponds to the real wants of the population."—J.S.

" and are consequently always taken to the hospital; but we Hospital  
" believe we are right in saying that, at hospitals of the Statistics and  
" purely 'country' class, urgent medical cases never present Hospital  
" themselves, except on the day of the weekly admission, and Hygiene.  
" then very rarely. Such a hospital, therefore, usually con-  
" tains a few grave accidents, and a still smaller number of  
" cases requiring surgical operation, amongst a much larger  
" number of chronic invalids, who have little more influence on  
" the sanitary condition, or on the atmosphere of the hospital,  
" than if they were in a condition of health: very few of the  
" patients are in any danger of speedy death, and of those who  
" are gradually sinking from visceral disease a great part prefer  
" to go home, when they find that they can expect no benefit  
" from treatment, or feel themselves near their death. Another  
" effect of this strict adherence to the letter system is that the  
" hospital is seldom, if ever, full; and that the daily average of  
" patients is very greatly below the number of beds.\* . . . It is  
" no exaggeration to say that a large proportion of those who  
" are under treatment in our country infirmaries might be  
" treated with as much success at home, while the victims of  
" acute disease are left to be attended in their own squalid  
" houses by the overworked officers of the club or the  
" parish."

These extreme differences of hospital-system must directly involve corresponding large differences of hospital-mortality. For easy and difficult tasks are not executed with equal quantities of success. But differences of death-rate thus occasioned are not facts of which the high-rated hospitals have any reason to be ashamed, or on which the low-rated hospitals can congratulate themselves.†

\* Out of 4,092 beds made up in the rural hospitals referred to in the report, only 2,813 were occupied at the time of the inspection.—J.S.

† Even with respect to two general hospitals, situated, as were Guy's and the old St. Thomas's, side by side in the same district, and having much similarity of constitution, no cautious reasoner would assume without certain knowledge that the two practices are of identical quality,—that a given large number of patients treated in the one hospital represents the same magnitude of illness as the same number of patients treated in the other hospital,—and that consequently any existing difference of death-rate between the two hospitals represents (in the proper sense of the words) a difference of hospital success. Indeed, as regards

The utter inutility of general death-rates as measures of hospital healthiness may be illustrated by reference to some curious little tables which the Registrar General has published at page 205 of his 24th Annual Report. The late Census having shown how many special inmates were, on April 8th, 1861, contained in each of the hospitals of England, and the common mortuary returns of the year 1861 having shown how many deaths had in that year happened in each of the hospitals of England, the Registrar General reckoned from these materials a *general death-rate per hundred occupied beds* [which death-rate, in order to distinguish it from death-rates calculated on other principles, I will call the *bed death-rate*] for each of several hospitals and groups of hospitals in England. Those *bed* death-rates—as being calculated, not on mean daily sick population, but only on the accidental inmates of a single day—cannot be more than approximative to true bed death-rates; and bed death-rates generally, by reason of the principle on which they are reckoned, are, in my opinion, for any hygienic argument, of all general death-rates the most fallacious\*—but both these objections to the Registrar General's bed death-rates are so trifling, when compared with the objections which I have stated in common against all general death-rates as measures of hospital healthiness, that I need not refrain from quoting the Registrar General's rates in illustration of my present argument. I accordingly annex a selection from them; partly to show how suspiciously great a range of death-rates there is among hospitals which are grouped as congeneric, and still more to show the very striking disparity of death-rates

the two hospitals which I have particularly named, I have reason to know that, at least for some periods of time, such an argument would have been fallacious. And if the comparison would not be strictly unobjectionable even for that peculiar case, to what objections must it not be open when applied to hospital systems so different as those described in the text?—J.S.

\* See note subjoined to the table. In both respects, their inconclusiveness may be illustrated by quoting the death-rates of a special hospital. Dr. Buchanan, one of the physicians of the London Fever Hospital, shows me that the bed death-rate of that hospital, calculated with reference to the number of special inmates who were in hospital on April 8th, 1861, was in 1860 nearly 300 per cent., in 1861 nearly 500 per cent., in 1862 nearly 2,000 per cent., and in 1863 nearly 1,400 per cent.—J.S.

which there is between the groups when treated as wholes. Among the large-town hospitals, for instance, the Nottingham has a death-rate under 41, while the Manchester has a death-rate over 130; and among the minor hospitals, the Swansea has a death-rate of but 10, while the Bath has a death-rate of 102. But more importance might seem to attach to the comparison which is suggested in the first three lines of the table. It is within the mark to say that, according to those figures, the death-rate of the large general hospitals of large towns is twice as great as the death-rates of small hospitals in small towns; and partially informed persons reading this statement might easily imagine that the figures contain a most important hygienic

lesson for hospital administrators. Nothing, however, could be farther from the truth. The figures—whatever other value

Classification of Hospitals, according to their respective Sites and Sizes.	Actual or Average Number of Special Inmates in each Hospital on April 8th, 1861.	Estimated Bed Death- rate for the Year 1861.
24 London Hospitals - -	176	90·84
12 Hospitals in large towns -	156	83·16
25 County and important pro- vincial Hospitals - -	90	39·41
<i>Hospitals in large Towns.</i>		
Bristol Royal Infirmary -	224	56·25
Birmingham Queen's Hospital -	135	58·52
Nottingham General Hospital -	137	40·88
Liverpool Northern Hospital -	101	128·71
Manchester Royal Infirmary -	202	130·69
<i>County and important Provincial Hospitals.</i>		
Brighton, Sussex County Hos- pital - - - -	109	66·06
Headington, Oxon, Radcliffe Infirmary - - - -	133	24·81
Dorchester County Hospital -	50	24·00
Devon and Exeter Hospital -	181	25·41
Bath United Hospital - -	78	102·56
Leicester Infirmary - -	83	61·45
Swansea Infirmary - -	80	10·00

N.B.—With reference to the *bed death-rates* given in the last column, it must be remembered that each bed receives during the year a succession of patients. A *bed death-rate* of 100 per cent. per annum means that in the course of the year there occurs on an average one death in every occupied bed of the hospital. The better principle on which to calculate general death-rates, for any little purpose which they can answer, is that of calculating them on the *aggregate number of cases treated* (during a year or any other given time) to a *termination*. This for distinction, may be called the *patient death-rate*. There is no necessary correspondence between such a range of *bed death-rates* as is shown above in the last column, and the range of *patient death-rates* for the same hospitals and groups of hospitals. Whether the two ranges would correspond or not, depends on whether the mean staying-time of patients is the same in all the hospitals and groups of hospitals compared. It is certain that this is not the case. The frequency of succession of patients (or, in other words, the mean staying-time of each) varies greatly in different hospitals; partly according to the size of the hospital in proportion to the number of applicants, partly according to the degree in which the hospital receives cases of acute disease. With knowledge of the mean stay of patients in hospitals, *bed death-rates* may at once be converted into *patient death-rates*, or vice versa.

they may have, are absolutely without intelligible relation to any question of hospital hygiene. For when read with such explanations as I have given (including these which are subjoined to the table) they are at once seen to be susceptible of widely different interpretations. They may be supposed, for instance, to justify any one of the three following conclusions:—(1) That the urban hospitals *change their sick population twice as often* as the rural hospitals, and that other conditions are equal; or (2) that in the urban hospitals *the mean gravity of cases received for treatment is twice as great* as in the rural hospitals, and that other conditions are equal; or (3) that in the urban hospitals *the success of treatment of given magnitudes of disease is half as great* as in the rural hospitals, and that other conditions are equal.\* These conclusions (it is scarcely needful to say)

\* That the last stated of those three conclusions would be untrue, and that the ambiguous differences of general death-rate shown in the Registrar General's tables are in fact mainly dependent on such influences as are adverted to in the first and second conclusions, will assuredly not be questioned by any one who carefully considers the evidence which Dr. Bristowe and Mr. Holmes have collected. It is therefore in my opinion very much to be regretted that, in oversight of the real facts of the case, some readers should have interpreted the Registrar General's statistics in the sense which they least properly bear, should have insisted on their being viewed as inculpatory of our great urban hospitals, and should in quoting them have levelled against the most useful of our medical charities imputations which (to say the least of them) that evidence will not justify. For instance, in the last edition of Miss Nightingale's often admirable *Notes on Hospitals*, material from the Registrar General's report is quoted to show that the general death-rates of English Hospitals range as in the above table, and the inference is suggested that these different death-rates correspond to different degrees of "healthiness" and "unhealthiness" in the several kinds of hospitals respectively. And Dr. William Farr, adverting to this subject, in a letter recently written to the *Medical Times and Gazette*, and published in that journal on the 13th February last, gives the world to understand, as apparently his opinion, that general hospitals, by reason of "defects" which "render them ways of death to their inmates," do not "benefit mankind directly," but "merely" as "pathological observatories and medical schools." It is fortunate that the subjoined report can relieve the medical profession and the public from the very painful but false impressions which Dr. Farr's language, while uncorrected, tends to create. The figures on which he relies show that during the year 1861, in proportion to the number of patients who were under treatment in the respective hospitals on the 8th April in that year, the hospitals in our largest towns had much more to do with dangerous forms of illness than the hospitals of country districts. But to conclude that the greater magnitude of illness in the town hospitals was a product of hospital-insalubrity, is as though one should conclude that the greater number of broken legs in a town hospital

are not compatible with one another. But the special influences named in the first and second of them are in practice so likely to concur, that a fourth conclusion affirming the joint action of those two influences is perhaps more plausible than either the first or second, and may, for argument's sake, be taken instead of them. It will then be seen that this conclusion, like the two out of which it is compounded, is essentially opposed to the third conclusion. The one would affirm, while the other would deny, a true difference of hospital success. But to decide between those very two propositions is, in any argument concerning the hygiene of hospitals, the only object of the discussion. Evidently, then, those general death-rates cannot, except by *petitio principii*, be deemed at all applicable to the purpose. Nor can any such use be made of them till other information mediate in the matter, and convert them (should this ever be possible) into general death-rates proportionate to fixed magnitudes of disease.

It follows, I think, from the preceding observations, that, if hospitals are to be compared for any useful purpose, they must be compared in very considerable detail. The kind of question which has to be answered, with regard to any two compared hospitals or groups of hospitals, is this;—what are the average rates of death (or what are the average times spent in recovery) among *cases of like nature* treated in each hospital respectively? And when I say "cases of like nature," I do not mean cases which popularly pass under

had been broken by some hospital-agency. And to argue that hospitals are "unhealthy" in proportion to the number of deaths which occur in them, is as though one should argue that bedrooms are proved to be unhealthier than dining-rooms, because more people die in bed than at table. Infinitely nearer to truth in these matters were the opinions expressed fifty years ago by that very able sanitary writer, Sir Gilbert Blane, when (in his paper on the prevalence of different diseases in London—a paper which I have more than once quoted in the course of my present report) he observed, as follows:—  
"The comparative mortality of different hospitals is a most fallacious test of the success of practice unless the nature and intensity of the several diseases are taken into account. A large mortality may even be considered as a presumption of an hospital being well conducted, in as far as it indicates that the most severe disorders had been admitted, or, in other words, that the most judicious selection of cases had been made." *Med. Chi. Transact.* 1813, p. 117.  
—J.S.





disease, or a larger proportion of the lithotomies had been of children; and it will follow that, even where such aggregate comparisons are between hospitals quite similarly circumstanced, any *omnium* of cases which is meant to exclude even approximately such sources of fallacy as I have indicated must

be of exceedingly large dimensions. So again, as regards physicians' practice, the "death-rates of fever-cases" would be entirely valueless for comparison unless the fever-cases were distinguished according to their respective kinds,—*typhoid*, *typhus*, *relapsing*, &c.; for, of the three best defined kinds of fever common in the united kingdom, two have a natural dangerousness seven or eight times as high as the third, and the fever-success of one hospital may have differed from the fever-success of another hospital only because the one hospital has happened to treat chiefly the more dangerous or the less dangerous kind of disease. Moreover the unsucces of treatment against a given kind of fever is not expressed in a form for exact comparison unless the fever cases be classified according to age;—for the natural dangerousness of a fever to the person who has it varies greatly according to his age,—so that, for instance, a typhus patient aged 55 is at least ten times as likely to die as a typhus patient aged 15. Nor can unsucces against a given kind of fever be spoken of in a comparative sense, without regard being had to the fact that the natural dangerousness of any given fever may be far greater in some epidemics than in others.

So much as regards the caution which must be exercised when the object is to use special death-rates as means of measuring hospital unsucces in relation to particular kinds

From Cheselden's Statement of the Result of 213 Lithotomies performed by him in St. Thomas's Hospital.			
Age.	Cases classified accord- ing to Age.	Deaths.	Death- rate per Cent.
Under 10 years of age	105	3*	2·85
From 10 to 20 - -	62	4	6·45
From 20 to 50 - -	32	7	21·87
From 50 upwards -	14	6	42·85

\* "One of the three that died out of the 105 was very ill with a whooping-cough; another bled to death by an artery into the bladder, it being very hot weather at that time." See Cheselden's *Anatomy*, 12th Edition, 1784. pp. 332-3.

of disease. That caution having been duly exercised, such death-rates may be of the utmost interest and value; for, in their perfection, they are true measures of medical and surgical unsucces, and may therefore be made instrumental, both to advance the professional science in some of its most important relations, and also to enlighten the public mind as to the respective merits of hospitals. But it must not be forgotten that, even when special death-rates exist in their trustworthiest form as material for comparing hospitals together, extreme caution is again requisite as to the conclusions which the comparison may justify. The immediate effect of the comparison is to demonstrate (say) for one hospital that it is comparatively unsuccesful in dealing with a certain set of cases,—that, in it, the natural dangerousness of lithotomy, or amputation, or fever, or what not, is aggravated by some abnormal influence. But hereupon the further inquiry ensues,—of what nature was the abnormally endangering influence which led to the demonstrated waste of life? The main possibilities of answer are three:—first, that the patients (from local circumstances, common to the population out of which they came) were of less than normal powers of life\*;—or, secondly, that the treatment was inferior;—or, thirdly, that the hospital was unhealthy. Absolute decision between those alternative verdicts cannot in any case be made without further information than the mere special death-rate would afford; though of course persons practically familiar with the subject would often recognise a *prima facie* probability against one verdict or another in regard of the particular speciality of unsucces. Commonly each special death-rate will have to be broken up into such component parts as respectively represent the operation of different morbid causes, and thus serve to confirm or rebut particular inculpatory suspicions. But, beyond this, other special death-rates of the same hospital might have to be examined, and the special death-rates of the hospital might have to be compared with analogous death-rates of patients in

\* With this answer, of course, the responsibility of the hospital would be absolved. See foot note, p. 146.—J.S.

the outside surrounding population, and the general sanitary state of that population might have to be taken into account.

Perhaps I cannot better illustrate the significance of these several questions than by referring to the part of the subjoined report which discusses the death-rate of major amputations, and particularly to the reporters' analysis of certain information which Mr. Teale published in 1858 with regard to 679 amputations of thigh and leg performed during the three preceding years in the various hospitals of England. The evidence

shows (see annexed table) that the average death-rate per cent. of such amputations is higher in London hospitals than in country hospitals\* in the proportion of 30 to  $27\frac{3}{4}$ . *Primâ facie* it is not probable that the treatment of such cases in London is inferior to the treatment of them in the country; and if provisionally that doubt be set aside, the apparent question to be solved is:—does

TABLE showing Mr. Teale's account of 679 amputations of thigh and leg performed in different hospitals in England.				
	Number of Cases.	Number of Deaths.	Percentage of Deaths.	
I.—All the 679 amputations whether for disease or for accidental injury -	1. In London hospitals -	314	103	30
	2. In hospitals of large provincial towns -	83	32	$38\frac{1}{2}$
	3. In country hospitals -	282	70	$27\frac{1}{4}$
II.—The 217 amputations which were for accidental injury -	1. In London hospitals -	98	49	50
	2. In hospitals of large provincial towns -	36	19	$52\frac{1}{2}$
	3. In country hospitals -	83	31	$37\frac{1}{2}$
III.—The 462 amputations which were for disease -	1. In London hospitals -	216	54	22
	2. In hospitals of large provincial towns -	47	13	$27\frac{3}{4}$
	3. In country hospitals -	169	39	23

\* The information collected by the reporters themselves with regard to 1837 major amputations (thigh, leg, foot, arm, and forearm) leads me to believe that the difference of success may be even considerably greater than Mr. Teale's figures represent:—that is to say, when those different amputations are taken together into calculation, it appears that, per 100 of them, the death-rate in the country hospitals is 19, in the hospitals of provincial towns  $25\frac{1}{2}$ , in the hospitals of London  $29\frac{1}{2}$ ,—or, in other words, that the special death-rate in the London hospitals is half as high again as in the country hospitals. Unfortunately the argument respecting these figures cannot be followed out, because the reporters were but very rarely able to learn the causes of such deaths as had occurred, and

the higher death-rate in London express that the London hospitals are less healthy than the country hospitals, or does it express that the average Londoner is less able than the average rustic to bear up against severe surgical operation? Now, let Mr. Teale's figures be followed a stage further:—it appears (though unfortunately the numbers are not so large as to make the conclusion incontestable) that the higher death-rate of London amputations does not belong to all the amputations indifferently, but belongs exclusively to amputations done for injury,—that in these cases the London death-rate exceeds the rural death-rate in the proportion of 50 to  $37\frac{1}{2}$ , but that in the other amputations the London death-rate is even a shade better than the country death-rate.

were even unable to obtain such information as would have enabled them to divide the amputations into the two main classes of *amputations for disease* and *amputations for accident*. Therefore it is that in the text I refer to Mr. Teale's less extensive but far more complete information. Here, however, I insert a table, which, if it serves no other purpose, may at least in some respects conduce to check hasty generalisation on the present difficult subject. It is founded on the tables which appear in the report. It shows (inter alia) that, while the amputation death-rate in London hospitals *generally* was half as high again as in country hospitals, the high death-rate was not common to all the London hospitals,—that, on the contrary, nearly half of the London amputations (187 out of 410) were done with about the same death rate as the 502 rural amputations,—and that, so far as those small materials for comparison go, London hospitals do not nearly so much differ in the aggregate from country hospitals as they differ individually from one another.—J.S.

TABLE showing some of the statistical results obtained by Dr. Bristowe and Mr. Holmes with respect to amputations performed at different hospitals of United Kingdom.

Period to which the Statement relates.	Hospitals.	All major Amputations.		
		Cases.	Deaths.	Percentage of deaths.
3 years -	Bartholomew and St. George's -	165	32	$19\frac{1}{2}$
4 " -	St. Thomas's -	133	43	$31\frac{1}{2}$
2 " -	Guy's -	85	41	$48\frac{1}{2}$
1 " -	London -	85	41	$48\frac{1}{2}$
3 " -	University -	85	41	$48\frac{1}{2}$
2 " -	Free -	85	41	$48\frac{1}{2}$
$\frac{1}{2}$ " -	Middlesex -	85	41	$48\frac{1}{2}$
1 " -	Westminster -	22	4	$18\frac{1}{2}$
3 " -	St. Mary's -	22	4	$18\frac{1}{2}$
*	Total of 10 London hospitals -	410	120	$29\frac{1}{2}$
From 1 year to 7 years.	34 rural hospitals -	502	95	19
From 1 year to 10 years.	20 hospitals of large provincial towns.	925	236	$25\frac{1}{2}$



If the figures given in the table express even approximately the true state of the case, it would seem an open question whether vital differences between the Londoner and the rustic do not count for a good deal in determining the apparent differences of hospital success\* ;—for differences of vital force would be likely to show themselves most in cases of such extreme vital shock as are primary amputations done on account of recent injury ;—and if the influence which determined the greatly higher death-rate of the 98 accident-amputations had been the influence of hospital unhealthiness, it is difficult to imagine why so powerful an influence should not have affected the death-rate of the 246 disease-amputations done in the same hospitals. Properly to discuss the question here suggested is quite impossible with existing data. For in such a discussion the elementary points for consideration would be these:—How many of the cases died under operation, or so soon afterwards that hospital unhealthiness (if it existed) could not have affected the result? How many died of complications, which quite unquestionably were accidental? How many died of diseases which hospital unhealthiness can produce? What, as regards these sub-specialities,

\* In relation to the particular figures which are under discussion, this question would have two parts: (1) Is the average Londoner less strong against vital shock than the average rustic? and (2) does the Londoner who comes for amputation on account of accident present on the average more bodily injury, especially as regards complication with internal damage, than the hurt rustic who goes for amputation? Strictly speaking, however, both of these questions ought to have been settled before the special death-rates are compared; for otherwise the comparison is not made with regard to equal difficulties of treatment. And for this purpose, as I have suggested at a former page, the record of amputations ought at least to enable any one who examines it to separate *complicated* from *uncomplicated* cases. Dr. Bristowe and Mr. Holmes are themselves of opinion, and speak of it as matter of general belief, that operation-cases treated in London are on the average cases of greater gravity than those treated in the country: there is, they "believe, very little doubt, that if we could take a "considerable number of the accident cases requiring operation admitted into "the wards of a hospital in a large manufacturing or seaport town, and compare "them with an equal number of accident cases requiring operation admitted into "a purely agricultural hospital, we should find the former comprised a much "larger proportion of complicated cases, of cases of 'smash,' than the latter; "in other words, the compound fractures arising from railways, from machinery, "from building operations, among shipping, and in dockyards, are more likely "to be associated with other grave injuries than those occurring in country "towns and among agricultural labourers."—J.S.

are the death-rates of other hospitals, some similarly, some dissimilarly, circumstanced? And what are such death-rates for private practice, in the hospital district and in other districts? In order to speak with confidence on such points as these, it would be an absolute *sine quâ non* to possess fully elaborated exact returns relating to very large numbers of cases and especially to their causes of death.

It is very much to be regretted that no such returns exist. And adverting again to the point at which I took up this particular illustration of the mode in which special death-rates have to be discussed, I must express my very strong feeling that these are matters on which doubt ought not to be suffered to continue. For, whether a particular hospital or group of hospitals has a disproportionate quantity of unsuccessful in its treatment of disease, is not a question of sterile statistical curiosity. The consideration that, where such unsuccessful exists, two out of the three solutions which can be suggested for its existence are solutions which would criminate the hospital or group of hospitals to which they refer, is surely argument enough to show how very greatly it is the interest of properly conducted hospitals to cause full and truthful records of their respective experiences in such matters to be kept. And if it is the interest of such hospitals, also, I will venture to say, it is their duty, and the duty of all. Indeed I beg leave to extend this expression of opinion to the entire matter of hospital experience. The doings of hospitals and the relative successfulness of such doings, are of great public importance; and all questions concerning them ought to admit of being answered quite unambiguously to the public. For, while hospitals claim to be exempt from taxation on the ground that they render service for which otherwise the community must be taxed, the community may surely require to be satisfied by precise information as to the value of the service which is rendered. In none but the largest hospitals could the task of keeping such records be of anything like troublesome amount. And in these particular cases there exists an additional and special reason why even a really troublesome duty ought not on any account to be declined.

Such hospitals are, always or generally, our great schools of professional study. And assuredly no hospital school of medicine and surgery is doing its full duty, unless it takes all possible means for recording the hospital experience in forms which shall test the efficiency of present practice, and ensure the promptest possible recognition of progress. No school of medicine deserves its name unless it be the scene of constant labour for improvement in professional science; and scientific medicine cannot be supposed to rest its belief on vague oral traditions of experience.

Let not, however, the preceding observations be misunderstood. My point is, that, during the present grievous imperfectness of hospital statistics, we cannot by such statistics accurately compare even in part (much less in entirety) the success of one hospital with the success of other hospitals, nor, à fortiori, the healthiness of one hospital with the healthiness of others. And I deem this to be a public wrong, and a bar to scientific progress. But meanwhile, happily for mankind, hospital unhealthiness is not a something about which no judgment can be formed, or which must needs wait unamended till by elaborate comparative statistics we have its exact mathematical measure before us. Sanitary defects, where they exist in hospitals, are appreciable by the skilled daily observers of the sick,—appreciable, in individual cases and according to common hygienic laws, as causes of disease or interruptions of recovery. I propose therefore to bring under consideration the elements from which these appreciations may be made, and, in order to do so, must first advert to the sanitary difficulties with which hospital managers have to contend.

The rules of hospital hygiene are, in principle, simple enough. That which makes the healthiest house makes likewise the healthiest hospital,—the same fastidious and universal cleanliness, the same never-ceasing vigilance against the thousand forms in which dirt may disguise itself, in air and soil and water, in walls and floors and ceilings, in dress and bedding and furniture, in pots and pans and pails, in

sinks and drains and dustbins.\* It is but the same principle of management, but with immeasurably greater vigilance and skill:—for the establishment which has to be kept in such exquisite perfection of cleanliness is an establishment which never rests from fouling itself; nor are there any products of its foulness—not even the least odorous of such products, which ought not to be regarded as poisons. Above all, this applies to the fouling of the air within hospital wards by exhalations from the persons of the sick. In such exhalations are embodied the most terrible powers of disease,—the spreading flames, as it were, of some infections, and the explosive fuel of others; and any air in which they are let accumulate soon becomes a very atmosphere of death. Against this danger ventilation is the one possible safeguard,—ventilation which with continuous current shall always be bearing away, as rapidly as evolved, every volatile taint which rises from the sick. So that, for hospital hygiene, ventilation requires pre-eminent regard. And if ever the phrase “well ventilated” may be (though indeed it never ought to be) at all indulgently construed in respect of a common dwelling-house, it must never, in respect of a hospital, be construed but with the utmost conceivable strictness.

There then lies the essential difficulty of hospital management,—a difficulty which many hospital administrators have found it easier to evade than to conquer. It is the difficulty of providing that throughout the whole of a really active hospital the means of cleanliness, and, foremost, the means of ventilation, shall be proportionate to the many special sources

\* Detailed considerations on the subject of hospital cleanliness, and generally on cleanliness in its relation to the sick, are so ably given in Miss Nightingale's two volumes of *Notes on Hospitals* and *Notes on Nursing*, that, even if the limits of my report permitted me (which they do not) to enter upon such considerations, I could not do better than refer to those well known works. I cannot do this quite unreservedly;—for some parts of the *Notes* (especially the parts which relate to the contagion of disease and to the interpretation of hospital records) are, for obvious reasons, not written with the same knowledge of facts as the parts on which Miss Nightingale is herself a high authority—the parts on cleanliness and on nursing. But while I necessarily take exception to the first-mentioned parts, I must express my strong sense of the general value of the books, and my sincere admiration of Miss Nightingale's exertions for hospital improvement.—J.S.

of foul and infective material. If that difficulty be not successfully met, certain characteristic evils will sooner or later arise:—diseases which are communicable from person to person will show an especial tendency to spread in the hospital, from patients to nurses and other attendants and to visitors, and perhaps even among the patients themselves;—and, among the surgical patients, wounds will show an especial tendency to deviate from the normal course of healing—an especial tendency to start certain peculiar morbid processes of their own. It is obvious that so far as those evils are in the ascendent, so far the usefulness of a hospital is lessened or annulled. And such being their high importance to the matter which is here under discussion, it seems to me right that I should speak of them separately and in some detail.

First, as regards the *spread of communicable diseases*:—each communicable disease has its own laws of communicability, —laws which must be properly understood if the danger of contagion is to be guarded against. The communication of some diseases (of scabies, for instance, and favus) is not by any true product of the human body, but consists in the migration of parasites, or germs of parasites, animal or vegetable, from one person's body to another,—a migration which of course the recipient may to any extent facilitate by dirty personal habits, and which, as regards some parasitic diseases, can scarcely be conceived to occur otherwise than in consequence of such habits. Other communicable diseases (and for hospital purposes they are the greatly important group for consideration) communicate themselves by that process which is distinctively called *zymotic*:\*—in the first affected body, and by or with a specific chemical transformation of some of its material, there is generated or multiplied a specific *zyme*, *contagium*, or *ferment*; which, if transferred while active to a second (not accidentally insusceptible) body, will there, according to the common law of ferments, excite

\* I take the present opportunity of suggesting, as in my opinion a most desirable amendment of present uses, that, in sanitary discussions, the word "zymotic" should never be employed but in its exact pathological sense.—J.S.

the same morbid phenomena, the same chemical changes, as those amid which itself was begotten.\* The several zymotic diseases are ætiologically quite distinct from one another.†

\* Some of the above expressions are meant to hesitate between two particular assertions. In this respect they correspond to the uncertainty which at present prevails as to the exact nature of some or all morbid ferments. A few years ago it might have seemed permissible to describe without reserve the contagia of the zymotic diseases, as but some changing organic material of the first affected body. At present, however, reserve on that point is necessary. That the power of contagiousness is associated with such changing organic material is certain;—but whether the power be *proper to the material*, or be only *contingently* its attribute, seems to require further investigation. The recent very interesting experiments of Professor Schröder in Germany, and of M. Pasteur in France (published respectively in Wöhler and Liebig's *Annalen der Chemie*, and in the *Comptes Rendus de l'Académie des Sciences*) aim at proving, most extensively, an essential dependence of specific fermentatory and putrefactive changes on the presence, in each case respectively, of some characteristic molecular living thing; and they give it to be understood that, if certain fermenting or putrefying organic matters tend by their contact to bring a given quiescent organic compound into chemical excitement like their own, this contagious power of theirs depends on their carrying with them those distinctive microscopical animal or vegetable forms which in each case respectively are the true agents of change. The conclusiveness of those experiments in the field to which hitherto they have been confined is still matter of the warmest scientific controversy; and while therefore it would be at least premature for me to insist upon them as evidence even in that field, it would be yet more premature for me to speculate on the possible results of an extension of similar researches to the pathology of zymotic diseases. But it is impossible to ignore their very important bearing in that direction . . .—J.S.

† How their respective first contagia arose, is, as regards nearly all of them quite unknown. This, in pathology, is just such a question as in physiology is "the origin of species." Indeed, regard being had to matters mentioned in the last footnote, it is hardly to be assumed as certain that these apparently two questions may not be only two phases of one. Hourly observation tells us that the contagium of small-pox will breed small-pox, that the contagium of typhus will breed typhus, that the contagium of syphilis will breed syphilis, and so forth,—that the process is as regular as that by which dog breeds dog, and cat cat, as exclusive as that by which dog never breeds cat, nor cat dog; and, prospectively, we are able to predict the results of certain exposures to contagion, as definitely as the results of any other chemical experiment. But, retrospectively, we have not the same sort of certainty; for we cannot always trace the parentage of a given case of small-pox or measles. And here, notwithstanding the obvious difficulties of proof either way, some persons will dogmatize that there must have been an overlooked inlet for contagium, while others will dogmatize that there must have been in the patient's body an independent origination of the specific chemical change. Presuming (as may pretty confidently be presumed) that in the history of mankind there was once upon a time a first small-pox case, a first typhus case, a first syphilis case, &c., and admitting our entire ignorance as to the combination of circumstances under which those first cases respectively came into existence, we have no scientific



Also they differ widely in their manifestations, and have widely different degrees of importance; some of them being comparatively trifling local ailments, while others are fevers and fluxes of more or less considerable danger to life. The different ferments by which they severally are communicated have respective peculiarities of their own,—peculiarities which are primarily governed by the nature and anatomical relations of the morbid process in which each particular ferment

reasons for denying that new "spontaneous generations" of such contagia may take place. But, as regards some of the diseases, there are conclusive reasons against supposing that this is of frequent occurrence. Where we can observe isolated populations, we find very long periods elapse without any new rise of certain "species" of disease. For instance, in 1846, the contagium of measles was imported by a sick sailor into one of the Faroe Islands, and led to an epidemic which attacked more than 6,000 out of the 7,782 inhabitants; sparing only the persons who previously had had the disease, and 1,500 who were kept out of reach of contagion; but before that time *there had not for 65 years been, in those islands, a single case of measles.* And the statistical return to which I have already often referred (Parliamentary Paper, 1864, No. 12.) contains another very striking illustration of the same sort of thing:—England has 627 registration districts. During the 10 years 1851–60, scarlatina, small-pox, and measles were (as usual) prevailing more or less throughout the country, producing among children under five years of age an average annual mortality of 802 per 100,000; *i.e.*, by scarlatina 419, by small-pox 103, and by measles 280. In 626 of the registration districts there were deaths (and, for the most part, in not inconsiderable quantity) from one or more of those causes;—not quite invariably from all of them; for 43 of the 626 (thanks no doubt, to vaccination) had not any death by small-pox, and among the 43 districts which thus escaped mortality by small-pox, there was one which also had not even a single death by measles;—but, with these exceptions, all the 626 districts had deaths from the three diseases—deaths by measles, deaths by small-pox, deaths by scarlatina. But the 627th district had an entire escape. In all the 10 years it had not a single death by measles, nor a single death by small-pox, nor a single death by scarlet fever. And why? Not because of its general sanitary merits, for it had an average amount of other evidence of unhealthiness. Doubtless, the reason of its escape was that it was insular. It was the *district of the Scilly Isles*; to which it was most improbable that any febrile contagion should come from without. And its escape is an approximative proof that, at least for those 10 years, no contagium of measles, nor any contagium of scarlet fever, nor any contagium of small-pox had arisen spontaneously within its limits. I may add that there were only 7 districts of England in which no death from diphtheria occurred, and that, of those 7 districts, the district of the Scilly Isles was one. Still to say that a disease is contagious is not to say that it may not arise without contagion. Indeed I shall presently adduce evidence to show the circumstances under which the "spontaneous generation" of the traumatic infections takes place. And the statements which were published in 1862 by Dr. Salisbury in the *American Journal of the Medical Sciences*, as to the producibility of measles by inoculation and other infection with *straw fungi*, deserve to be borne in mind.—J.S.

originates:—all of them are essentially unstable and transitory, but, while some of them tend under ordinary circumstances to undergo a rapid extinction, others of them can with comparative ease retain their power for long periods of time, and some apparently have not their full force till some time after they have left the diseased body;—some of them associate themselves indistinguishably with one or more of the common excretions and exhalations of the body, others are separately tangible in vesicles and pustules or at ulcerating or suppurating surfaces, and may or may not also exist in other products of the body;—some of them are evolved in small quantity, others in very large quantity, or with very large natural admixture;—some of them are fixed, others but very scantily volatile, others as volatile as if they were vapours;—some of them operate easily on a second body by mere contact (more or less prolonged) with the outer or inner surface to which they are applied, others are not found to act unless they come into contact with accidentally abraded surfaces, or be thrust into the bodily substance by inoculation. Thus,—in vaccine lymph and in the matter of chancres respectively, there is a contagium which we know only in a fixed form, and only as communicable by intentional or accidental inoculation:—also ophthalmia and gonorrhœa and glanders are communicable by the fixed contagium which their pus contains; but this contagium does not need inoculation to infect the mucous membrane to which it is applied; and as regards ophthalmia, there are reasons for suspecting that to some extent the contagious pus may retain its activity when dry enough to float as dust in the air:—in some forms of milzbrand (including, probably, the so-called "malignant pustule" which is the best known human form of the disease) the highly virulent fluids can, it is alleged, infect by soakage through the cuticle:—in diphtheria, the characteristic exudation is capable of infecting by contact; and though often the disease is communicated from person to person without any manifest transplantation of matter, it may be that in such cases particles of the decomposed false membrane are conveyed as a volatile contagion:—cholera and typhoid fever send forth their respective contagia for the most part, if

not exclusively, as matter dissolved or suspended in the evacuations which pass from the patient's bowels; and probably these evacuations (which, at least in cholera, gradually develop their full infective force after their discharge from the body) can under some circumstances bring into similar contagious fermentation the excrement with which they are mingled in privies, drains, and cesspools, and can thus convert the effluvia and leakage from such sources into means of extensive secondary infection of air and water:—the volatile contagion of hooping cough is probably disengaged in large quantities by the air-passages, and as it forms is sent forth with the breath:—in typhus, small-pox, measles and scarlatina, the diffusion of volatile contagium occurs to a vast amount, probably with all exhalations from the body; and in addition to this, contagium, more or less fixed, collects abundantly about the patient's person and bedding; and, in a far less degree, something of the same sort probably occurs in erysipelas. It is evident that many of these contagia can scarcely be deemed sources of danger for well-conducted hospitals. If proper ward-discipline exists, no patient is allowed to expose himself to the risk of close intercourse with cases of contagious disease;—and, subject to that condition, most morbid poisons are of little effect except where the sanitary circumstances are grossly bad. Contagions which will not spread except by inoculation, or by the kindred agency of dirty bedding, or dirty towels, or dirty sponges, or dirty fingers, or by the drinking of polluted water, or by the effluvia from drains or cesspools, ought to be absolutely incommunicable in hospitals. So ought those to be, which will not spread except where pus, or matters like pus, are abundantly floating in the air.\* But not all diseases which are capable of

\* The extent to which organic matter may be present as floating dust in such atmospheres as that of an ill-ventilated hospital ward, is only beginning to be recognised. A minute examination of external air for solid matters, which might perhaps be disseminated in it, had been made during the cholera epidemic of 1849 by Dr. R. D. Thomson, and the results of his inquiry (which, however, were negative) were communicated by him in 1850 to the Royal Medical and Chirurgical Society of London. Again, towards the close of the cholera epidemic of 1854 (when a Medical Council with a Committee for Scientific Inquiries was advising the then General Board of Health on matters relating to the epidemic)

spreading in hospitals spread according to those types of Hospital  
uncleanliness. I advert to others in which the patient during Statistics and  
many successive days and nights evolves, continuously and in Hospital  
profusion, volatile, highly diffusive, contagia. Such diseases Hygiene.  
are typhus and small-pox and scarlatina and measles. And it  
is peculiarly while they are being treated in a hospital, that  
the merits of the hospital ventilation may be tested. By no

an inquiry of the same nature was, at the instigation of the Committee, made by Dr. Thomson and Mr. Rainey; and the results of this inquiry were published in 1855, with the report of the Committee upon them. Though again there were no results which could be deemed important in relation to cholera, Mr. Rainey gave some interesting evidence as to matter which may be suspended in the air. Floating in the air of the cholera ward of St. Thomas's Hospital there were not only minute hairs, particles of smoke, epidermic scales, vegetable fibres of different kinds and colours, starch granules, &c.; but also there were living forms, both animal and vegetable,—vibriones, namely, and the mycelia of fungi. Since that time, the inquiry has accidentally received a new impetus in the interest excited by M. Pouchet's observations, published in the Comptes Rendus of 1859 and 1860, as part of his endeavours to establish the spontaneous generation of rudimentary organic forms;—for though the gist of his evidence was to deny the diffusion of living organic germs in the air, he added new proofs as to the abundance of organic debris which even the external air may contain, and he devised a new apparatus for demonstrating the shaped ingredients of the atmosphere. Recently the inquiry has become important for my present subject. Two years ago, in the discussion of the French Academy of Medicine on the subject of hospital hygiene, M. Devergie mentioned some examinations of air which had then recently been made at St. Louis by M. Chalvet, house surgeon of that hospital, with the result of finding in the surgical wards a much larger quantity of floating organic matter than in the medical wards:—especially in the neighbourhood of cases of hospital gangrene there are, M. Devergie says, "enormous proportions" of such matter; and in an analysis which was made by M. Kullmann of some of the dustings or plaster from the rarely whitewashed walls of the wards, 46 per 100 was found to be organic matter,—"*proportion véritablement effrayante, qui transforme les parois de la salle en un foyer d'infection permanente, laquelle infection varie en plus ou en moins suivant la condition de l'atmosphère.*" M. Chalvet's experiments were suggested by some which M. Reveil had previously made (with substantially similar results) at La Riboisière. In 1861, Dr. Eiselt of Prague stated that, during an epidemic to ophthalmia which had recently prevailed in the Foundling Establishment of Répy, he had been struck with the fact that elder persons (including himself, the surgeon to the establishment, and several nurses) were attacked with the disease,—persons whose eyes certainly had not had, in the ordinary sense of the word, any contact of purulent matter; that this fact suggested to him to examine such matters as he could collect (with a modification of Pouchet's aeroscope) from the air of one of the wards;—that he did this one morning "after the ward had been ventilated," taking for his aeroscopic station the space between two beds in a ward where there were 33 cases of acute purulent ophthalmia;—and that after the first passage of air through the instrument, puscorpuclles were evident on the glass. See Zeitschr. der k. k. Gesellsch. der Aerzte in Wien, 1861, Wochenblatt 13.—J.S.

known resource of science can it be contrived that patients suffering from those diseases shall not be probable sources of infection to persons of normal susceptibility, who, for the first time, come into close relation with them. Fortunately it happens that to have once had any of those diseases is, generally speaking, a protection against having the same disease again; and that to have been properly vaccinated (all the more if re-vaccination after puberty have been performed) is almost perfect security against any serious danger from small-pox. Persons of adult age, who are likely to be in attendance on the sick, are nearly sure to have had measles, for its contagium is universally current in this country; and for a similar reason they are very likely to have had scarlatina and (if they have not been vaccinated) small-pox. Thus, as regards those diseases, such persons are in great part an insusceptible population. But not so with typhus. For happily the contagium of this terrible fever is of comparative infrequency among us;—and when epidemics of it occur, it must very often be the case that those who are nursing the sick have themselves never had typhus, nor ever before encountered typhus contagion. Of such persons, a certain considerable proportion will, notwithstanding any hitherto known perfection of sanitary circumstances, be found to contract the disease. And the same sort of danger will of course affect them when ministering to the sick with small-pox, scarlatina and measles, if from any cause they still happen to have susceptibility for those diseases. In the present state of knowledge it cannot fairly be deemed ground for presumptive condemnation of a hospital, that typhus, or any of the last-mentioned diseases, spreads to some of the persons who are in attendance upon the sick. There is inevitably a certain quantity of danger to be encountered, and that danger, even when reduced to its minimum, will not fail to be represented in its result by a certain quantity of suffering and death. But the quantity varies according to the sanitary circumstances. Even as regards nurses, who do every personal office about the sick, the danger of contagion ranges, as ventilation and cleanliness range, from a minimum—which, in their case, unfortunately, is always a considerable danger—to a maximum, which means

that perhaps half or a third of them will die. So, too, as regards those officers and servants whose attendance on typhus-patients is less frequent and less close, the range of danger, though from a very much smaller minimum, still reaches to a maximum of very great danger. And these worst degrees of danger, incurred by sanitary fault, cannot exist without great concurrent probability that the sphere of their operation will widen,—that patients who have come to the hospital to be treated for perhaps some comparatively trifling ailment will contract a fever which may kill them outright, or may give them months of suffering and incapacity,—and this, notwithstanding that the ward-discipline has been strict, and the conduct of patients obedient, with regard to the avoidance of all near personal intercourse.

From considering the spread of contagion in hospitals as (under some limitations) one evidence of hospital unsuccess, I now turn to consider that other evidence which consists in the origination of certain forms of disease.

In ill-kept hospitals wounds go on badly. Instead of running their normal course of repair and recovery, they—whether accidental wounds, or wounds made by operative surgery—undergo certain characteristic morbid changes. Erysipelas will frequently attack them. So will other morbid processes akin to erysipelas,—such morbid processes as those of gangrene and phagedæna, and putrefactions of effused or otherwise stagnant blood, and re-opening of half-healed arteries and veins, and septic and suppurative infections of the system, and so forth,—morbid processes, which, with erysipelas, may for my present purpose conveniently be generalized under the one name of *traumatic infections*. And if the hospital receive lying-in-women, these infections will constitute different forms of so-called puerperal fever.

Traumatic erysipelas is a true zymotic disease,\*—a disease in which the affected materials of the body furnish a specific contagium. On but too many occasions the contagiousness of the disease has been convincingly and fatally proved;—enough,

\* This is equally true of the non-traumatic erysipelas,—the pathology of which disease, however, needs not here be particularly discussed.—J.S.



perhaps, had there been only such evidence as is adduced from hospital surgery;—but still more by evidence, again and again given, that a surgeon going to a puerperal woman from attendance on a case of erysipelas may convey the specific contagion to the uterine surface of his new patient, and occasion her death by that form of puerperal fever which under a special name is in fact but intra-abdominal erysipelas. But to say that the disease is contagious is not to say that no case of it can arise without contagion from a previous case. Indeed in this respect erysipelas has a peculiar place among the zymotic diseases. Probably, of all the specific contagia, the contagium of erysipelas stands in nearest affinity to the ferments of common cadaveric decomposition, and is therefore aptest to rise *de novo* whenever certain animal textures and juices, or the effluvia from such textures and juices, are falling into common putridity. Immense mortality from puerperal fever in one division of the Vienna Lying-in-Hospital, varying from about a fourth to about a ninth part of all the deliveries which took place there, was believed by Dr. Semelweiss, the head of the department, to depend on an infection of which “the *real source was to be found in the hands of the medical men in attendance contaminated with cadaveric poison.*” The other division of the hospital (reserved for the practical instruction of midwives, whose training does not require them to be brought into contact with dead bodies) suffered only about a tenth part as much as the first; and this was the more noticeable as the second division was inferior to the first in the size and airiness of its wards. Dr. Semelweiss, acting upon his supposition as to the cause of the disease, required that the male attendants of the first division should, as much as possible, avoid contact with cadaveric matter; that after such contact they should never make a vaginal examination till the following day; and that, besides very thoroughly cleansing their hands, they should systematically *disinfect them with a solution of chlorine.* The latter precaution was not introduced till some months after the more general precautions had been adopted. The result of these measures was, that the mortality of the first division at once fell to

the usual average of the second division. In 1846 the death-rate per cent. had been  $13\frac{2}{3}$ ; in 1847 it was  $5\frac{1}{3}$ ; in 1848 it was  $1\frac{1}{3}$ .\* And the relation of this fact to the possible “spontaneous generation” of erysipelas contagium is not, I think, far to seek. For any wound in the unhealthy state which is technically called “foul” is in fact a surface of decaying animal matter; that which surgeons call a “slough” or “mortified part” is a dead bit of the animal body undergoing just such putrefactive changes as it might undergo in the dissecting room; and accordingly, if cadaveric decompositions can easily furnish the contagium of erysipelas, every surgical ward of an active hospital must (in respect of the natural processes of disease which are going on in it) be a likely birth-place for that contagium. Thus, for instance, if a patient has been admitted with a contused wound of such severity as involves local mortification, that mortification would include in itself an essential liability to the formation of erysipelas contagium. Whether the contagium, if thus engendered, produces in that particular patient the spreading surface-inflammation which characterises erysipelas, may depend on his personal susceptibility, and specially, no doubt, on the then-existing chemical state of his live textures next adjoining the wound:—but, whether his general mass of body be or be not infected by the specific contagium which has been engendered in his wound, in any case contagium would be set free, and would act on the atmosphere of the ward. Its influence in this atmosphere would be determined by circumstances: if the ward were well ventilated, dilution or oxidation would probably have rendered the contagium inert before it had travelled far from its source; but if, on the other hand, the ward were ill-ventilated, either absolutely or in proportion to its contained quantity of ill-conditioned surgical cases, then probably the unclean atmosphere would abound with material which the contagium could convert into its own likeness; and such an atmosphere, continuous through the whole length of the ward, and perhaps receiving increments of new formed con-

\* See Dr. Routh on the Epidemic Puerperal Fever of Vienna, Med. Chirurg. Trans. XXXII.—J.S.

tagium from other beds than the first, would be so very dangerous an influence to even the best-conditioned wounds that probably there would be in the ward what is called an "epidemic" of erysipelas;—and, in addition to the danger that the contagion might thus by continuity of atmosphere spread from one patient to others, there is also danger, except with the cleanliest and most careful nursing, that attendants will convey it from one part of the ward to another in the successive wound-dressings which they perform.

Of the other traumatic infections, the zymotic relations are not quite so clearly established. The immediate cause of pyæmia in any given case is that some diseased part (which, however, needs not be an external \* wound) so affects the blood circulating through it, that this blood afterwards excites destructive suppurations in parts to which the circulation carries it,—viz., commonly first in the lungs or (in certain cases) liver and lungs, and later generally about the body. Perhaps in its completest form, but certainly in great part, pyæmia can be experimentally imitated in the lower animals by the injection of a little normal pus into a vein. And there is not, I think, any valid reason for doubting but that this kind of material infection of the blood, accidentally arising, is the essential cause of human pyæmia;—and this equally, whether the pyæmia be in connexion with internal disease, or be in that more familiar surgical combination which has here to be particularly considered. Of all traumatic infections, of all mischances to which major surgery is subject, pyæmia is by far the most fatal.† Its attacks under

\* In a case of which I was cognizant (and which Mr. Bowman describes in his Lectures on the Anatomy of the Eye, p. 127) fatal pyæmia in a young gentleman was apparently produced by the accident that an ulcerated state of the mitral valve of his heart, where perhaps there had been a small primary abscess, allowed inflammatory products to flow into the blood of his left ventricle. In another case which I remember, fatal pyæmia was produced by the penetration of pus from a small mesenteric abscess into the thoracic duct, whence of course it passed on to the right side of the heart. And in several instructive cases published by Dr. Bristowe in the 13th volume of the Pathological Transactions, pyæmia is shown as occasionally complicating almost ab initio cases of idiopathic necrosis unattended by external wound.—J.S.

† Neither as regards the general population, nor as regards hospital practice, have I any means of stating in what *quantity* pyæmia prevails. But, as regards the *proportion* in which deaths from pyæmia stand to deaths from all causes in

ordinary circumstances are happily not frequent, but it kills nearly all whom it attacks. Not all surgical patients having wounds have an equal, or nearly equal, liability to it. It shows an almost infinite preference for the cases where bone-structure (particularly cancellous bone-structure) has been injured, as in compound fracture, or in the surgical procedures of amputation and resection, and all the more perhaps in proportion as the injured bone is large. The other cases in which it occurs are principally those in which large vein-trunks have been involved in the traumatic inflammation. The local changes which in either sort of case precede and introduce the pyæmia are not hitherto well understood. But we know that very often they are part and parcel of a process which is not simply suppurative, but involves also much foulness of wound; and we know that among them the putrefactive softening of local blood-clot and other fibrinous matter has generally an important, if it have not always an essential, place. For commonly, till they set in, there will have existed protectively in each injured vein of the part firm blood-clot of greater or less extent, closing the vein towards the focus of traumatic irritation; but now these barrier-clots, undergoing just such a change as clot undergoes when it putrefies after removal from the body, soften and fuse away, partly at least into the circulation,—where apparently it is the ferment-action of their material, or of material which their fusion lets enter from adjoining sources, that establishes the pyæmic state, and therewith usually more or less of common putrid infection of the blood. That pyæmia so often pre-supposes a local working of putrefactive ferments, is a fact which concurs, I think, with other evidence to suggest the pathological affinities of the disease. And the fatal significance of putrefactive ferments in relation to the traumatic infections probably does not end here. Probably

hospital-practice, I may refer to a table which the reporters give. The materials are far too small to justify any but the most moderate and negative conclusions. But, such as they are, they show pyæmia causing 50 out of 2,874 deaths in the London hospitals, and 37 out of 1,086 deaths in the country hospitals;—i.e. about 17 per 1,000 in the former, and about 34 per 1,000 in the latter. It must be remembered that in these quantities of pyæmia, *all* pyæmia—non-surgical as well as surgical—is included.—J.S.

the putrefactive softening of blood-clot plays an equally important part in relation to the occurrence of secondary hæmorrhage from tied arteries,—a part far more important than the mere anatomical conditions to which, in the older literature of this subject, a too exclusive consideration has been given. Finally, that also phagedænic and gangrenous processes are in their very essence processes of death and putrefaction for the parts which they affect, is a fact which is on the very surface of their pathology; and that at least some of these processes are true zymotic diseases, is rendered probable by very strong considerations of analogy, as well as by statements which have been published of their inoculability from patient to patient.\*

An attack of any of these traumatic infections has generally the same meaning as an attack of traumatic erysipelas. It is true that any member of the whole series—erysipelas, pyæmia, softening of clot, gangrene, phagedæna—may, within a large surgical experience, occur to some considerable extent from causes which are purely personal.† And (especially where such is the origin) one of them may occur without the others. But, except where personal conditions exclusively decide the occurrence of these lamentable infections (and clearly this is only to a limited extent) they tend to prevail conjointly or in succession. That they differ somewhat from one another in the intimate nature of their respective

\* See, for example, Thomson's Lectures on Inflammation; 1813;—p. 484.—J.S.

† "Foulness" of wound-surface is, in a very large number of surgical cases, a necessary transit to recovery, being merely the gradual exfoliation of particles which the first severe onset of disease or injury has killed; and, among cases of grave injury, it very often happens that wounds (as containing either much crushed and killed texture, or much effused and stagnant blood, exposed to common atmospheric influences) will be seats of such considerable putrefaction as must necessarily infect, in a very dangerous way, the respective patients whose parts are thus affected. Any septic infection which the general atmosphere of a somewhat ill-kept hospital ward could bring to such a patient would be small, when compared with that infection which his own foul wound occasions him. Nor must it be forgotten that personal predisposition (varying with the quality of previous health) counts for a very great deal in determining the course which a given wound shall take,—so that, quite irrespectively of sanitary circumstances, a patient of damaged health will often undergo extensive sloughings or ulcerations, or more definite traumatic infections, which another patient, similarly injured, but otherwise of good health, would quite escape.—J.S.

chemical processes is possible or even probable;—but that they have in common an intimate affinity with ordinary putrefactive processes seems to be the leading fact in their pathology. Provisionally I regard them all as zymotic diseases, the respective contagia of which may arise in any putrefaction of wound-products. And this view of their nature tallies both with their just-mentioned tendency to prevail more or less together wherever any one of them prevails largely, and with their tendency thus to prevail only in concurrence with certain sanitary circumstances. In order that an epidemic outbreak of these diseases in a hospital ward shall be possible, there must, it seems to me, always be this sanitary fault;—that the ventilation of the ward (even though it be, in common parlance, fairly good ventilation) is inadequate to the quantity of traumatic impurity generated in the ward,—that thus there prevails throughout the ward, or in sections of it, an atmosphere which contains much decaying animal matter of the kind which wound-surfaces contain,—and that any zymotic change arising in this atmosphere, or on any wound-surface which exhales into it, has peculiar chemical facilities for infecting other wound-surfaces within the range of influence.

The hospital experience of past times abounds with dreadful illustrations of the extent to which this influence may operate in wards which are, in the popular sense of the words, "overcrowded" and "ill-ventilated." When John Howard (not quite ninety years ago) was writing on these matters he described hospitals where it must have been a rare thing for an important surgical case to recover.\* And though horrors

\* See *passim* his famous work, or even the following reference to it in Sir Gilbert Blane's admirable paper on the prevalence of different diseases in London:—"It is a remark of Mr. Howard, in the account of his visitation of prisons and hospitals, that at the hospital at Leeds no case of compound fracture nor trepan survived, till the ventilation of the wards was improved. This was effected by causing large openings to be made over the doors leading to the passages. At the Hôtel Dieu, formerly so notorious for its filth, bad air, neglect, and crowding, no operation for the trepan succeeded during the whole time that M. Marceau was chief surgeon, which was fifty years, insomuch that the operation was laid aside. Such are the circumstances which engender the hospital gangrene, and are to surgeons what typhus fevers are to physicians. The air may not be so foul as actually to generate these evils; but in any



of that sort may now fairly be deemed to have become impossible for civil hospitals, yet, in times long subsequent to Howard's, something not very dissimilar might be seen in military practice; and the annexed report [A] will show that sometimes, even recently, considerable prevalence of traumatic infections in civil hospitals has been due to gross faults of crowding and non-ventilation. I refer particularly to the series of instances which the reporters give [A]; and I may also advert to the striking illustration which I gave in my report of 1858 from the experience of a large lying-in hospital.\* I may add, too, that the far less prevalence of traumatic infection in London than in Paris seems to be exclusively due to the far better system of ventilation which is general in London.

It often occurs that traumatic infections are for long periods absent from wards which even to the popular eye are overcrowded and ill ventilated, and that in wards which do not obviously offer any such defect the diseases may have considerable prevalence. But the meaning of this apparent anomaly is (as I shall hereafter more particularly explain) that the zymotic effects of overcrowding and ill ventilation may be greatly augmented in intensity in proportion as certain kinds of disease are kept, each kind by itself, instead of being mixed and diluted with cases of other kinds of disease;—that, for instance, traumatic infection may, notwithstanding inferior sanitary circumstances, be absent from a mixed ward in which but few cases of wound are present, or in which the severe cases are in minute proportion to the remainder; though perhaps the substitution of two or three

“degree it retards sensibly all cures, whether surgical or medical; and it indispensably behoves all those who have the superintendence of hospitals not to rest satisfied with anything short of perfect purity. Without this the most skilful treatment is thrown away. At the time in which the Hôtel Dieu was so greatly mismanaged there were seen three, four, and even five in one bed. The rate of mortality was that of one in four; hardly any acute cases, child-bed cases, or capital operations survived. About the beginning of this century a remarkable improvement took place in the conducting of this hospital. Of late times it has been well ventilated, never overcrowded, cleanliness carefully studied: the result of all which has been that the mortality is that of one in eighteen.”

\* See above, Vol. I., p. 477.—J.S.

compound fractures for two or three simple fractures in this ward would suffice to develop there an epidemic of the infections in question. Also it deserves notice, that the chemical power of some of these contagia seems rather apt to linger (in spite of all ordinary cleansing) in wards which have once been thoroughly unwholesome with it,—seems as though it could to some extent fix itself to the absorbent wall-surfaces of wood or plaster. Thus, there cannot, I think, be any doubt but that in the hospital-ship “Dreadnought” this kind of zymotic taint in the walls has operated injuriously on the sick; and if the same thing cannot be equally well proved with regard to ordinary land hospitals, that, perhaps, is only because with them the same kind of experiment has not been so distinctly made.\*

In the preceding observations I have endeavoured to express what in my opinion are the pathological principles on which hospital unsucccess may be judged and measured in the two matters where it is most apt to betray itself. I have taken care to exclude the supposition that an occasional

\* In my report of 1858, I wrote as follows on the then experience of the Seamen's Hospital:—“The old hospital ship ‘Dreadnought’ had acquired a very evil reputation for the prevalence of these infections; dependent, no doubt, in part on the natural ill-adaptedness of a ship to the purposes of a hospital; but probably also in part dependent on organic contamination still lingering in the wooden walls of the wards. Early last year another more commodious ship was substituted for the ‘Dreadnought;’ and Mr. Tudor, the resident surgeon, informs me that, whereas, in the two years preceding that change, 9 out of 22 amputations had terminated fatally, only one amputation had proved fatal out of 16 performed in the year following the change; and that, whereas formerly erysipelas and hospital-gangrene were so common and so spreading as to have let him see there at one time as many as 18 cases of hospital-gangrene, he has now scarcely seen erysipelas, except in patients admitted with it, from whom as a rule, it no longer spreads to other inmates of the ward.” Thus far, it will be observed, the change had been all for the better. But little by little since that time the old state of things has returned. And now the report made of the ship (see p. 719) is, that traumatic infections are “excessively frequent,” that “operations do very badly,” that “pyæmia is frequent.” The obvious explanation of this history lies, I think, in the suggestion made in the text. I may add that in my experience of the former St. Thomas's Hospital, I had very strong suspicion that at least one of the old wards suffered from that kind of chronic taint. And M. Kullmann's analysis of the wall-scrapings of the wards of St. Louis (quoted in a previous foot-note) may serve, though as a very extreme instance, to illustrate the liability of which I speak.—J.S.

solitary case of some traumatic infection, or an occasional communication of (say) typhus from patient to nurse, is, even pro tanto, proof of unskilful hospital management. I have conceded (what indeed every pathologist knows) that to some extent such events occur without any discoverable relation to conditions of uncleanness,—that wounds will often become unhealthy from causes strictly personal to the patient,—that typhus is so powerfully contagious a disease that persons who are immediately about the sick will in very large proportion, sooner or later, have an attack of it. But of evils which are capable of gradation from small to immense proportions, surely even the smallest degree should be matter for jealous scrutiny. Hospital managers will hardly work their hospitals to the fullest advantage, unless they be vigilant even as to solitary originations of traumatic poison, and solitary cases of hospital contagion. And at least it ought to be accepted as an axiom in hospital management, that any *concurrence of cases* of traumatic infection originating within the hospital, or any spreading of febrile or other contagion to even a single *patient* within the hospital, is conclusive reason for inquiring whether the fundamental difficulty of hospital management has not here been unskilfully met.

Evidently in either case the inquiry ought particularly to be made with regard to the ventilation of the wards,—so particularly, that for my present purpose I may consider this to be the only question at stake.\* If typhus spreads from bed to bed in a ward, or if traumatic infections prevail there, presumably the ventilation is not proportionate to the number and kind of cases under treatment.

Presumably there is one of these three faults: either (1) the ward, from its original construction, has not means of being

\* Of course, where typhus has spread, it may appear that patients have been in improperly close personal intercourse. If a patient who is susceptible of typhus frequents the bed-side of a typhus-patient, no ventilation of the ward can give him more security against contagion than it gives to nurses and doctors. But, as I stated at a former page, no such intercourse ought ever to occur; and, in any well-regulated ward, ample vigilance would be used to prevent it. In order to avoid the necessity for incessant qualifications of language, I assume in the argument of my text that that proper ward-discipline is in force.—J.S.

well ventilated; or (2) the ward has means of being well ventilated, and the administration of those means has been neglected or bungled; or (3) patients of one kind (traumatic or typhus) have been gathered together in such proximity that no practicable ventilation suffices to disinfect their atmosphere. And to each of these three possibilities the inquirer must give separate consideration.

So thoroughly does a hospital depend for its usefulness on the capacity of its wards for the most exquisitely perfect ventilation, that in all plans of hospital construction this is the one cardinal virtue to be insisted on. The ventilation must be such as shall leave no corner unsearched by its currents. These, within the wards, must never for a moment cease flowing from inlet to outlet,—must be flowing so largely that every unwholesomeness is at once removed by them, yet so gently that they are almost or quite unperceived as currents, and so evenly that no inmate of the ward can complain that his place is unfairly scoured by them. In theory the most desirable arrangement of ventilation would be, that fresh air, proper in temperature and otherwise, should diffuse impartially from about the middle point or middle line of the ward, and that the outflow of air should be by openings respectively placed above the several bed-heads in the ward. Evidently this conception could not be realized except in some system of artificial ventilation, wherein the currents would be determinately regulated, and wherein the arriving air would in case of need be modified in temperature or otherwise. Of course, there is not in that problem anything essentially impracticable, nor perhaps even extremely difficult, for physical science to accomplish. But hitherto it is unsolved. Hitherto, I believe without exception, plans of artificial ventilation for wards have been costly and fatal failures. And in the present state of knowledge, the utmost that can be said for them is that some of their appliances (specially those for withdrawal of used air) may advantageously be used as additions to that more natural ventilation which, at least in this country, has appliances provided for it in the common conditions of decent house-construction. Open windows and (as substitutable for them in certain states of weather)



other direct, but less drastic, air-holes through the walls of the ward, are at present the essential *inlets* for fresh air.\* They also, under many circumstances, are the *outlets* for used air:—but in this function chimneys co-operate with them,—acting, when fires are alight, very serviceably as outlets; and it never can be otherwise than advantageous to the ventilation of a ward that subsidiary shafts should give a greatly increased development to the resources of that ordinary chimney-action. For in-ventilation, then, our reliance must be upon direct air-holes, of which open windows are the chief; on these same means we must also, under ordinary circumstances of construction, rely for a large share of out-ventilation; and thus, whatever other appliances exist, a ward must be perfectly ventilable by its windows. Now, hospital construction has pro tanto failed in its first obligation, if the form and arrangement of wards, and the distribution and planning of windows, be not such that each separate ward (independently of all other wards, and of all staircases, passages, corridors, and offices) shall admit of that kind of ventilation in its completest possible form. An oblong ward, from 25 to 30 feet wide,—windowed correspondingly on its two long sides with sash-windows reaching to the top,—and windowed in such proportion to wall that between each two windows there shall be the required space for one bed-head,—and having its communications and separately-ventilated offices at its two ends;—this, by common consent, is the form of ward which best of all answers the proposed purpose.† And in proportion as this

\* Contrivances by which the effect of direct air-inlets is mitigated in relation to the inmates of a ward are principally of two kinds:—(1.) The air passes through a sieve of perforated zinc, by which its force is broken and its coldness somewhat lessened; or (2.) by means of some special ventilator, the current of incoming air has such a direction given to it, that, before it can directly affect any inmate, it must diffuse considerably in the ward, and merge its cold in the average temperature of the ward. Mr. Brotherton, of Manchester (in his pamphlet on Hospital Construction published in 1856) has well shown the advantages of a system of air-holes, covered with perforated zinc, when set facing one another along the two opposite sides of a ward. [And, in our present time, the value of Tobin's ventilating-tubes has to be remembered.—J. S. 1887.]

† On what plans of construction several wards may be combined into hospital-wholes, is a matter of little or no sanitary importance,—provided always that one ward does not impede the ventilation or lighting of another, and presuming of

form is departed from, in such proportion, sooner and sooner, will the limit of the ward's usefulness be reached,—the point, namely, at which ventilation will prove insufficient,—the point at which typhus will spread from bed to bed, and at which traumatic infections will arise among surgical cases.

Whether a ward's existing means of ventilation are properly utilized, is a matter of ward-discipline, which, like all such matters, requires extreme vigilance on the part of directing officers. And such officers, in addition to their other qualifications, ought to be persons of extremely acute scent for every uncleanness which can vitiate the air. It would be idle to deny that, in this catarrhal climate of ours, ventilation by open windows has its inconveniences. Unfortunately there are times when those who regulate such ventilation must

course that each ward in itself is healthy. If the contagious fevers respectively are treated in separate wards, the object of their separation will be somewhat more completely accomplished if the wards allotted to each fever respectively are made into separate blocks, so that the medical attendants and others—in going, for instance, from their smallpox or scarlatina patients to other patients, must always pass through the open air. But, otherwise, I am not aware of any important sanitary object to be gained by that kind of separation. The notion that a large general hospital cannot be healthy unless it be broken into so-called pavilions, each of which shall have but two stories, has not, I think, any sufficient foundation in facts. In 1858 this subject was discussed in connexion with the plans for Netley Hospital; and I cannot better express my present opinions about it than by quoting what I then wrote in answer to a reference from the War Office:—"In some of the papers which you have communicated to me, pointed allusion is made to a so-called *hospital atmosphere*, as a danger specially incidental to buildings where many patients are congregated *under one roof*. In reference to this I would observe (first repeating my conviction as to the paramount importance of ventilation in every building intended for the sick) that, if by the above-quoted expressions it be meant that *patients in clean, well-ventilated, and not over-crowded wards, with separately well-ventilated passages and staircases, are apt to breed an atmosphere* [which, along passages, or through floors and ceilings, or up or down staircases, will be] *dangerous to those under the same roof with them*, I have no information which could lead me to accept the doctrine. Under opposite circumstances, the continuity of foul atmosphere might indeed be dangerous. But as regards wards kept as wards ought to be kept, I cannot conceive that the several clean items will make a dirty total; and, so far as my present knowledge extends, I have every reason to believe that, *subject to the qualifications I have stated*, a given number of patients may dwell under one roof as safely as under several roofs." Nor, subject to the same qualifications, have I any reason to suppose that patients will not recover so well on upper as on lower stories. Of the various surgical wards in which my own hospital experience has been, the one which I remember with most satisfaction was a top ward which had three stories of wards under it.—J.S.



admit the air but scantily, lest its cold should do even more harm than its freshness will do good. And there are times when the best possible choice between these two evils will not absolutely exclude a certain admixture of both of them;—when, at least as regards a mixed ward, the ventilation is perhaps far less than we should desire for the case of typhus or of compound fracture, yet the temperature lower than can be well borne by the patients with sensitive air-tubes and the patients with Bright's disease. To get the best attainable adjustment, it is requisite that those who superintend the sanitary management of the hospital, and especially those who visit the wards at night, should bring to their task, not only some skill, but great attention to details, and thorough pains-taking patience. The difficulties are at their minimum where wards are constructed as they should be. They go on increasing in the ratio in which construction shows worse, till, with some forms of ward, no two bed-spaces can be ventilated but by gusts brought across other bed-spaces, and every attempt at efficient general ventilation provokes cries of inconvenience or injury from a large proportion of the ward's inmates. It is with reference to this dilemma that hospital managers have to estimate the supreme importance of a good first construction of the hospital:—for the working capacity of a ward has to be rated, not according to a theoretical estimate of how many beds may stand upon its floor, but according to the practical issue—how much of a given kind of disease can safely and successfully be treated there; and clearly the cost of hospital construction is not cost wisely incurred, if the wards, by faults of construction, lose half or more of the working capacity which their cubic dimensions are supposed to give. Yet even with the best construction the difficulty is not quite at an end. Nor perhaps will it entirely cease till, with the progress of mechanical invention, it can be contrived that ventilation, in other respects perfect, may at will be rendered warm or cold. But meanwhile (without pretending to dogmatize on a subject which I practically know to involve a great variety of considerations) I would express a doubt whether, with our present appliances, the real minimum of the difficulty can be attained, unless, in

the warding of patients, cases be classified, as far as possible, on the basis of their respective requirements of ventilation and powers of tolerating cool air.

It is in my opinion a fact of much importance for hospital success, that the two dangers of which I am particularly speaking (the danger that febrile contagion will spread, and the danger that traumatic infections will arise) vary considerably in amount according to the arrangement of cases. Each patient with certain sorts of fever, each patient with certain conditions of wound, is the source and centre of a specific air-pollution, which ventilation (as it is good or bad) tends more or less rapidly to neutralize, but which (notwithstanding even good ventilation) necessarily extends to some distance from its source. Never ought any patient to lie within range of any other patient's morbid odours or of any other patient's contagium. Invariably beds ought to be so far apart, and the spaces between them to be so well ventilated, that under most circumstances no such dangerous nuisance can be expected to occur. Whenever, with any extraordinarily infectious or offensive case, the interspaces appear to be insufficient for perfect safety, it will be right that the next adjacent beds should be left unoccupied; and if the emanations from any one patient are either so unmitigably foetid, or (as the reporters believe of smallpox) so diffusely contagious, that no distance in one ward will suffice to render them innocuous, then a case arises for separate treatment;—treatment which in the latter case, would be in wards special to the one disease, but in the former case might have to be in isolation.\* But in my opinion the arrangement of patients in a ward ought to go even beyond what I have yet insisted on. Not only

\* The object of such an isolation would of course be equally well attained if a sufficient separate out-ventilation were given to the one patient's bed, by bringing it into connexion with an out-cast ventilating shaft. Arrangements by which this kind of special ventilation could be provided for such cases as might require it would, I think, be among the most useful additions which could be made to our present hospital appliances. And hints for the purpose could be gathered from the contrivances by which, in some factories, hurtful dusts which a manufacturing process engenders are, as they form, withdrawn from within the workplace by currents of out-cast ventilation, adapted by hoods to each dust-producing machine.—J.S.

ought not any one patient to be within the sphere of any other patient's air-pollution, but also great pains ought to be taken lest similar spheres of air-pollution coalesce (if I may so express myself) at their circumferences. Especially this has to be thought about with regard to cases of typhus, and with regard to cases of severe surgical injury and operation. When several cases of either of these sorts are set together in a ward, generally it may be seen that a new increment of danger accrues in the mere fact of their propinquity,—more than common disposition of the typhus contagium to spread from patients to nurses in the ward,—more than common disposition of the wounds to fall into zymotic processes. With utopian spaciousness and ventilation, such perhaps might not be the fact. But in our actual circumstances it is greatly so, and the danger must be distinctly regarded. The cases of like nature must either be considerably separated by intervening different cases, or, if they be kept in groups according to their nature, they must, on this account, have an increased allowance of space.\* In

\* Mr. Whitfield, the resident Medical Officer of St. Thomas's Hospital, who has always had his home in that hospital, and can speak with intimate personal knowledge of the last 45 years of its experience, tells me some interesting facts in corroboration of the above argument. In 1818 (when he began to attend the practice of the hospital) and for some years afterwards, the wards used to be in common for medical and surgical cases; and in those days, though no doubt the sanitary management of the hospital was not so good as it afterwards became, there was not in his recollection any decided propagation of fever among the patients, nor, except very rarely, any communication to nurses or sisters in the wards. In 1828, or soon afterwards, the separation of medical from surgical cases was made, and separate wards (one for males and one for females) were allotted to each physician; and each physician received patients in weekly turn with his two colleagues. Under this system, whenever there was an epidemic of fever, the worst fever cases of each week were sure to get gathered together into particular wards. And now fever spread. "The sisters, nurses, and pupils not only became victims to the condensation of infection, but the mortality was great, so much so that the Governors called upon the medical men to adopt some measures for its amendment. The plan then proposed was to limit the cases of fever in the old wards to 4 in each, and the new wards (north wing) then recently built, to 6." And now the old immunity returned. "On the plan being carried out, it is but fair to say that with few exceptions it was attended with the most marked success; though, that an occasional case of typhus or scarlet fever has been communicated from patients to patients, or to the nurses in the hospital, it would be vain to deny." Under the severe pressure to which the hospital was exposed in the first half of 1862, when typhus

surgical practice, especially, this matter requires particular attention:—for it is the custom of all large hospitals to separate the surgical from the medical cases, and in many of such hospitals there are further classifications which tend to throw very much together into special wards the graver kinds

was severely epidemic in London, 10 nurses and 5 patients apparently contracted typhus from 98 cases admitted with that disease. Within about the same time, 14 cases of scarlatina were admitted, and 1 nurse and 1 patient caught this infection. Since that time St. Thomas's Hospital has been very inadequately represented by an adaptation of the quondam Music Hall of the Surrey Gardens. Into this building 33 cases of typhus have been received, and its contagion has affected 3 attendants, but happily no patient. Of scarlatina, 21 cases have been received, and its contagion has unfortunately affected 1 patient as well as 3 attendants. Cases of typhoid fever have of course always and abundantly been under treatment; but I have no information that contagion has ever spread from them. With reference to the sad extension of typhus in the old hospital in 1862, Mr. Whitfield mentions that of the 5 patients who apparently contracted typhus from other patients, only 1 was in the admirably constructed modern part of the hospital, the other 4 having been in the old wards, "which, it will readily be admitted, were not constructed on the most modern or best principles." And with particular reference to the large number of nurses who suffered, Mr. Whitfield writes as follows:—"On finding that there was great nervous depression amongst the sisters and nurses (not only in consequence of the patients in the house, but from the reported mortality in other hospitals of some of their sisterhood) I allowed to each in the medical wards two glasses of wine per day. From that time, with one exception, not a single nurse took the fever; and what is a remarkable fact, the one solitary nurse who caught it was one who would not take the wine." Mr. Whitfield's conclusion (and it is one to which I attach much importance) is, "that with a still greater separation than would be considered necessary for the ordinary run of disease, we might hope to admit fever and other infectious diseases during an epidemic without prejudice to the other patients. The plan would be, for the time required, to greatly diminish the number of the beds in the wards to be given up for the emergency, especial care being enforced that the beds appropriated to fever, &c. had a sufficient superficial space allowed to them, and not to over estimate the cubical contents of the wards, as an equivalent to the area round each bed;—it is one of the great mistakes of the present day. Supposing a ward calculated to contain in ordinary times 30 general patients, the dimensions of which ward might be 135 feet long, 30 feet wide, and 16 feet high, and in which ward the distance between beds would be 18 feet from foot to foot, and 6 feet from side to side, the cubical contents would be 2,160 feet per bed. By reducing the number of beds down to 18, I should make a fever ward with a distance between its beds of 18 feet from foot to foot, and 15 feet from side to side, giving cubical space of 3,600 feet to each patient; a space which I should think quite adequate to any emergency. By carefully excluding at such times all chest affections from these wards you would be enabled to allow a much larger volume of fresh air, so essential in the treatment of fever and all infectious diseases, but which would be prejudicial to pulmonary complaints."—J.S.

of surgical injury and operation.\* It must not, I think, be ignored, that here, unless extraordinary precautions be taken, the patients incur an increased liability to the rise and spread of traumatic infections. For the difficulty of providing adequate ventilation for a given surgical case varies with the nature of the case,—the generation of foul products being in some cases no more than in health, while in other cases it is enormously large; and a ward, which could be adequately ventilated if it contained a fair admixture of these two classes of cases, may have an entirely unmanageable intensity of traumatic atmosphere if only the latter class of cases be received into it. Such a ward is, in every practical sense of the word, overcrowded; and the consequences of surgical overcrowding will arise in it.

I wish that it were in my power to complete my consideration of these subjects by comparing together on a large scale, in relation to them, the different hospital experiences of the United Kingdom. Evidently with the present materials no such comparisons can be made.† Not even *results* for comparison are forthcoming. And what value would there be in comparing results unless also *difficulties* could be compared? That a given hospital has not had in it any spread of contagious disease, or that it has not originated any cases of traumatic infection, does not necessarily imply any sanitary

\* Adverting to the remarks made in a previous footnote on the experience of the hospital-ship "Dreadnought," I would here suggest that, where the practice is as above described, it might be well that, if practicable, every special ward should every year change the nature of its special duty.—J.S.

† At the time when the reporters made their visits, they found that cases of traumatic infection, originated within hospitals, were (in proportion to the number of surgical cases under treatment) nearly three times as numerous in London as in the country. But they give reasons for not considering this to be a true picture of the average state of things. They also point out that in London the number of cases of traumatic infection (29) which had arisen within the hospitals was greatly exceeded by the number of such cases (41) which had been admitted with the disease already existing;—whereas, in the country hospitals, the number of cases (13) which had come from outside was but small in comparison with the number (30) which had arisen within the hospitals. Further, on examining, so far as their very limited materials would permit, the proportions in which pyæmia had contributed to the respective totals of hospital death in town and country, they found, as I have detailed in a former footnote, that in the country hospitals deaths from pyæmia in proportion to the total number of hospital deaths had been twice as numerous as in the London hospitals.—J.S.

merit in the hospital. Either fact may merely mean that the sanitary merits of the hospital have not been tested. And surely it is no matter for praise that a hospital escapes the difficulty of an intense traumatic atmosphere by the chance that its surgical practice is petty;—still less is it matter for praise, that the hospital evades the difficulty of contagion by ruling that no contagious fever shall receive medical assistance within its wards. The merit of a hospital is to conquer these difficulties, and to conquer them at their utmost. If the hospital be in a position where contagious diseases do not appeal for admission, and where but few severe surgical casualties and operations occur, then almost certainly it may be said that the hospital is not wanted where it stands. It is for other circumstances than these that my proposed test of hospital management is applicable,—the test, whether contagious disease is treated with the least possible spread of contagion, and whether surgical practice goes on with the least possible hindrance from outbreaks of traumatic infection. If a hospital cannot answer this test, doubtless it is but an imperfectly healthy hospital. But if, because of the hospital's position, or because of its rules, that test of healthiness is never applied, then, whatever may be thought of the healthiness, the usefulness of the hospital is but small. In short, it is here as it was with the general death-rates. There is but one fair and practical way of estimating hospital success. In all these discussions, and whether hospitals be compared with one another, or be judging themselves singly on their results, the word "success" is utterly delusive unless it means "success in proportion to endeavours." Where hospitals are doing exactly similar work, there a comparison of hospital results will be a comparison of hospital merits. But in any other case it must be mere playing with figures. And for me to attempt it on any large scale with such materials as I have before me would, I think, be indiscreet and wrong. Therefore I have confined myself to suggesting the principles on which, in my opinion, the working of any individual hospital may fairly be criticized by the hospital managers, and may, here and there, to a very limited extent, be compared with other standards.



I particularly regret that my materials do not allow me to submit any exact positive conclusions on the influence of SITE as an element of hospital salubrity,—especially as regards the broad difference between town and country. But obviously there is only negative evidence on this subject,—evidence, that such differences of site as came under the reporters' consideration were not of appreciable effect in the presence of those large other differences which universally were concurrent with them, and by which all influence of theirs (if such influence there was) must have been either out-weighed or exaggerated. As regards the relative advantages of town and country, this difficulty is strongly shown by one conclusion of the reporters:—"English rural hospitals have acquired, on false grounds, a reputation for comparative healthiness;—by their regulations, their practice, or their position, they receive habitually a far less serious class of cases than is admitted into the hospitals of London and other large towns;—this difference in the quality of the practice is much greater in respect of medicine than of surgery, but is considerable even as regards surgery;—the result is, marked lowness of death-rates, even (in many cases) in the presence of a high degree of hospital insalubrity." Notwithstanding this difficulty, however, it may safely be assumed as certain, that, where there are *true* differences of salubrity between two different places,\* hospitals at those places respectively will, *cæteris*

\* By the "true salubrity" of a place, I mean the salubrity of its *common* atmosphere, and other *common* influences,—its freedom, in respect of those influences, from all tendency to breed endemic disease. A district which itself is quite salubrious may have a fictitious appearance of insalubrity from the fact that many or most of the houses in it are ill-built and ill-kept, or because large sections of its population are of unhealthy personal habits or circumstances. But distinct from these sources of fallacy, there are also in this country some known true differences of salubrity. Thus,—to take first the extreme illustration, there are some districts which breed ague and the allied disorders. Again, there are the minor differences of salubrity which depend on differences of soil, especially where clay is compared with the soils which are least retentive of moisture. Again, subject to some qualifications, there are differences of salubrity dependent on differences of level. At present, also, between town and country, there probably are true differences of salubrity—differences, however, which do not all tell one way, as well as enormous fictitious differences of salubrity. On the one hand, the common atmosphere of country is much brighter than the common atmosphere of town, and is also comparatively

*paribus*, have corresponding differences of success. But, waiving all consideration of the difficulties which at present there would be in any attempt to compare the true salubrity of districts, I must observe that the principle which I have stated admits of but very limited application. For primarily the site of every hospital must be decided by the site and distribution of the population to which it has to minister; and if, as too commonly happens, reasons of trading convenience or other reasons have determined a population to settle itself in a site of comparative insalubrity, the hospital which has to minister to that population can seldom do otherwise than to some extent share the same lot. All that it has then to do is to make the best settlement which is possible within the limited area of choice. But, even under these restrictions, the choice is not a matter of indifference. Perfect security ought to be sought for the drainability and water-

unpolluted by animal effluvia and many other kinds of impurity; while, on the other hand, whatever morbid influences may come from the soil are likely to be less potent in town than in country,—and, indeed, it may have been thus that the marked preference of diphtheria for rural rather than urban districts arose and is to be accounted for. But all the above differences, except the first, are of almost imperceptible effect in this country, when compared with those local influences which are irrespective of true district-salubrity,—the influences, namely, which operate in detail, and consist in multiplied separate instances of sanitary mismanagement or misfortune. So overwhelming are these latter influences, that hitherto it has been practically impossible to get any true measure of the others. But constantly we have opportunities of observing that well-kept establishments maintain a very satisfactory healthiness in the midst of districts which popularly have the worst reputation for salubrity:—Bedlam, for instance, in the district of St. George's, Southwark, or model lodging-houses in various poor districts of London. Why St. George's, Southwark, has an exceedingly high death-rate, and why in our epidemics of Asiatic cholera it has suffered beyond most districts of London, is matter of sanitary record, on which I need not enter;—but Bedlam, having good sanitary arrangements for itself, takes no apparent share in the unhealthiness of the district in which it stands, and has never, during all our epidemics of cholera, had even a single cholera death within its walls. The Whitechapel district, in which the London Hospital stands, has a death-rate half as high again as the death-rate of St. George's, Hanover Square, and the death-rate of the West London District, where St. Bartholomew's Hospital stands, is almost equally high:—but differences like these have no necessary connexion with true differences of district-salubrity, and there is no reason whatever for supposing that, if either of those two hospitals could transfer its practice to the western district, the results of that practice would show any appreciable improvement of success.—J.S.

supply of the future hospital. A clay soil ought, if possible, to be avoided. Also, where the hospital is for a town, sites must be compared with special regard to their respective degrees of spaciousness and ventilability; and in order to get more of these advantages, so far as the pursuit of them consists with the due accessibility of the hospital, preference commonly ought to be given either to the outskirts or to the largest interior spaces of towns. Except for special reasons to the contrary, hill-tops are to be preferred to hill-slopes, and either of them greatly to valley-bottoms. And the cleaner the neighbourhood the better. But in this respect it may be proper to add, that, against the common nuisances which not infrequently exist in towns, and by which town hospitals may be aggrieved, the hospitals, like private individuals, can look to the law for protection and redress.

It would be foreign to my present purpose to discuss with any minuteness the vastly different degrees in which different hospitals endeavour to be useful to the public. But this is a matter which, in respect of many charities, eminently deserves further criticism. And therefore I would again invite attention to the statements which Dr. Bristowe and Mr. Holmes make with regard to the effect of certain regulations in restricting the usefulness of hospitals. Especially I must advert to the rules which prohibit the admission of cases of contagious fever, and in effect exclude most other acute diseases from the benefit of hospital treatment. It seems to me that in such rules there is implied the dereliction of a hospital's most important functions. I cannot conceive any cases having more claim to hospital treatment than those cases of typhoid, and sometimes typhus fever, which the rules would expressly and rigidly exclude. To leave such cases in the ill-provided homes of the poor is not only to withhold the assistance of the charity from persons in very urgent need of the best attainable medical treatment, but it further involves, as an almost necessary result, that the disease shall continue its ravages in the family, and perhaps greatly beyond the family, which it has attacked. Fifty years ago, adverting to

this matter, Sir Gilbert Blane found it "difficult to conceive what idea the authors of such a regulation could form of a hospital as a beneficent institution, the end of which is the alleviation of human misery;" and his language might have been stronger than it was, if he could have seen such evidence as we now have, of the indirect effect of that regulation in excluding other large classes of disease which quite pre-eminently claim hospital treatment. I am far from contending unconditionally that every existing hospital ought to receive cases of contagious fever; for, among those hospitals which the reporters describe, there are some where such fevers could not be treated in common with other diseases, without the certainty that their contagion would spread. But with reference to such hospitals I must submit, that they, while they cannot safely receive fever, are but fragments of that hospital accommodation which every populous place ought to have for its sick poor. Either they ought to be reformed, so that fever could properly be treated in them, or they ought to be superseded or supplemented by others. And if the wealth and charity of a neighbourhood are insufficient for the maintenance of such a general hospital as may receive all severe cases without distinction, then, I would suggest, the maintainers of the smaller charities might do well to consider whether, in their admission of patients, the present order of preference ought not to be absolutely reversed,—whether all other claims of disease ought not to be regarded as subordinate to the claims of contagious fever.

In a preceding passage of this report I have suggested that it is, for various reasons, incumbent on the managers of hospitals to cause such records to be kept as may show what work is done in each hospital, and what is the successfulness of the work. And now, in conclusion, I will venture to submit my opinion, that it would conduce very considerably to an improved administration of funds given for purposes of medical charity, if some department of the government were annually to collect all such records, and to publish from them information which would enable just comparisons to be made between

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the doings of different institutions, and the proportions which such doings bear to the requirements of the respective neighbourhoods. Indeed, not only with reference to the general hospitals to which my previous remarks have always referred, but with reference to all medical charities, it seems to me that something of that kind is greatly wanted. In saying this, I do not only refer to that very wholesome emulation and progress in the art of healing, which it would be the tendency of such a publication to develop among the different institutions of the country, but refer also and emphatically to a non-medical aspect of the question. At present, when the public is appealed to, as incessantly it is, to give money to this or that new undertaking for professed purposes of medical charity, it is almost wholly without means of judging how far the particular purposes are already accomplished. It has only *ex parte* statements before it. Nor can it well judge of the needs and merits of established charities, excepting by such statements as the directors of some charities put forth,—statements which for the most part are framed solely with the view of moving public sympathy, and which, in order to this object, are often highly coloured and partial. The want of something like method in matters of medical charity leads to an infinite waste of charitable resources, and doubtless this waste (after the manner of all wastes) implies privation in one place as against superfluity in others,—here an overlapping and duplication of well-intended charity, and there comparative bareness and destitution. A perfectly harmonious organization of these matters (such an organization as there is in Paris under the *Bureau de l'Assistance Publique*) is of course not to be expected under that system of voluntary co-operation which distinguishes the charities of this country. But at least an approximation to it might be made—and an approximation which would not involve the smallest sacrifice of any one institution's independence, if the public could have before it such authentic materials as I propose, for forming a judgment on the distribution and efficiency of all means of medical relief.

It would be essential to the usefulness of any such publication, that the records which it would purport to compare

should be records kept on an uniform plan. And very important furtherance might, I think, be given to the general introduction of such a plan, if some of our leading hospital physicians and hospital surgeons would confer together as to the tabular forms which in their judgment might best serve to record all useful information, and would combine both to urge the adoption of such forms at their own respective hospitals, and also to recommend similar forms to other hospital officers throughout the country.

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#### From the Seventh Report to the Privy Council, 1864.

[The Seventh Report comprises:—A brief reference to the continued superintendence of Public Vaccination, which is omitted from the reprint, *vide* Vol. I. p. 364; a section on the Distribution of Disease in England devoted specially to (i.) House Accommodation; (ii.) the working of the Nuisances Removal Acts; (iii.) the Parasitic Diseases in Animals used for Food.

Then follows an account of the miscellaneous proceedings of the year 1864.—1. Inquiry into the extraordinary large proportion of deaths which pulmonary phthisis was apparently causing in the south-western counties of Wales: an excess which Dr. Hunter showed to be due to the fact that a large proportion of the deaths were not medically certified, and that among the non-medically certified deaths the term consumption was commonly used in a multitude of senses. 2, 3. Inspections, also undertaken by Dr. Hunter, at Congleton, as to the industrial circumstances which develop excesses of lung disease, and at Crickhowell into the causes of the high general death-rates. 4–12. Nine local inquiries into the local dependence of typhoid fever upon sanitary defects principally of drainage and water-supply. 13. An inquiry respecting typhus fever at Liverpool by Dr. Buchanan, shewing all facts and circumstances of the epidemic, and describing the action taken by the local authorities with a view to limit the spread of the disease, and to provide treatment for sufferers. 14. An inquiry at Woolwich, by Dr. Bristowe, into an alarming prevalence of enteric fever.

The Section of the report relating to the Distribution of Disease in England is here reproduced.—Ed.]

#### DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED—*cont.*

##### 1. *House Accommodation.*

In further pursuit of an object which had been proposed in 1863, and towards the attainment of which one important

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step had in that year been made by their Lordships' very extensive inquiry as to the food of the poorer laboring classes,—in further pursuit, namely, of the object of ascertaining with what degree of sufficiency the primary wants of the body are satisfied among the poorer classes of the population,—my Lords during 1864 caused to be made throughout England an inquiry as to the house-accommodation had by the agricultural and other laborers of rural districts. The inspector employed on this important inquiry was Dr. Hunter. He, in making it, examined in the different counties of England as many as 5,375 occupied houses, and investigated, in each place that he visited, what local circumstances were in operation to affect the quality of the dwellings of the poor.

As I observed last year with regard to their Lordships' Food-inquiry, so with regard to the present Dwellings-inquiry I may observe, that it does not pretend to be exhaustive; that for obvious reasons it could but be an examination of *samples*; and that the trustworthiness of its results depends entirely on the degree of success which has been attained in finding samples which are fairly representative. It may be that perfect success in that respect has not invariably been attained,—that sometimes the good in a place has not fully come to light, and sometimes not fully the bad. But having regard to the dimensions of the inquiry, and to the precautions with which it was conducted, I feel assured that its general results must be true for very large masses of population.

Dr. Hunter's report is subjoined in extenso [A]. It seems to me to deserve in two respects very particular consideration:—first, as regards the evidence which it gives on the matter to which it primarily relates; and, secondly, as regards the information which it incidentally contains on the working of the Nuisances Removal Acts in the rural districts of England.

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To the insufficient quantity and miserable quality of the house-accommodation generally had by our agricultural laborers, almost every page of Dr. Hunter's report bears

testimony. And gradually for many years past the state of the laborer in these respects has been deteriorating,—house-room being now greatly more difficult for him to find, and, when found, greatly less suitable to his needs, than perhaps for centuries has been the case. Especially within the last twenty or thirty years the evil has been in very rapid increase, and the household circumstances of the laborer are now in the highest degree deplorable. Except in so far as they whom his labor enriches see fit to treat him with a kind of pitiful indulgence, he is quite peculiarly helpless in the matter. Whether he shall find house-room on the land which he contributes to till, whether the house-room which he gets shall be human or swinish, whether he shall have the little space of garden that so vastly lessens the pressure of his poverty,—all this does not depend on his willingness and ability to pay reasonable rent for the decent accommodation he requires, but depends on the use which others may see fit to make of their "right to do as they will with their own." However large may be a farm, there is no law that a certain proportion of laborers' dwellings (much less of decent dwellings) shall be upon it; nor does any law reserve for the laborer ever so little right in that soil to which his industry is as needful as sun and rain. Yet were this the whole hardship, his case would be less desperate than it is. For they who arbitrate the comfort or discomfort of his lot might then at least have found a small balance of advantage to themselves in having him resident on his place of work; while, as regards the bit of garden which would be almost wealth to him, and for which he would cheerfully pay the outside rent which it is worth, his money would have been as good as another man's. But an extraneous element weights the balance heavily against him, and he loses those fair chances of free trade. The element to which I refer is the influence of the Poor-Law in its provisions concerning settlement and chargeability. Under this influence, each parish has a pecuniary interest in reducing to a minimum the number of its resident laborers: for, unhappily, agricultural labor, instead of implying a safe and permanent

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independence for the hard-working laborer and his family, implies for the most part only a longer or shorter circuit to eventual pauperism,—a pauperism which during the whole circuit is so near, that any illness or temporary failure of occupation necessitates immediate recourse to parochial relief; and thus all residence of agricultural population in a parish is glaringly an addition to its poor-rates. In parishes where property is much subdivided, this relation between poor-rates and resident laborers may be but indistinctly felt, or, however much felt, would be recognized as an infliction which cannot easily be evaded. But large proprietors feel the burthen very definitely and considerably, and, while feeling it, cannot but know that they have facilities, which are deemed not to be illegal, for shifting it away from themselves. They have but to resolve that there shall be no laborers' dwellings on their estates, and their estates will thenceforth be virtually free from half their responsibility for the poor. How far it has been intended in the English constitution and law that this kind of unconditional property in land should be acquirable, and that a landlord, "doing as he wills with his own," should be able to treat the cultivators of the soil as aliens whom he may expel from his territory, is a question which I do not pretend to discuss. But I think it all important that the working of this system, as exhibited in Dr. Hunter's report, should be clearly seen by those who can judge it in its legal, as well as in its moral, relations. For that power of eviction which I have described does not exist only in theory. On a very large scale it prevails in practice,—prevails no doubt under a variety of motives, but chiefly under that pecuniary one which the Poor Law everywhere supplies,—prevails as a main governing condition in the household circumstances of agricultural labor. What, in different cases, are the relative magnitudes of hardship will be best seen in the details of Dr. Hunter's report; but, as regards the extent of the evil, it may suffice to advert to the evidence which Dr. Hunter has compiled from the last Census, that destruction of houses, *notwithstanding increased local demands for them*, had, during the last ten years been in

progress in 821\* separate parishes or townships of England; Agricultural laborers. —so that, irrespectively of persons who had been forced to become non-resident, these parishes and townships were receiving in 1861, as compared with 1851, a population  $5\frac{1}{3}$  per cent. greater into house-room  $4\frac{1}{2}$  per cent. less. And it is scarcely needful to observe that, besides these 821\* extreme cases, where houses of a parish were pulled down in the teeth of an increasing population, there were also innumerable parishes where the demolition of houses was going on more rapidly than any lessening of the population could explain. When the process of depopulation has completed itself, the result (says Dr. Hunter) is a show-village, "where the cottages have been reduced to a few, and where none but persons who are needed, as shepherds, gardeners, or game-keepers, are allowed to live;" . . . regular servants, who receive the good treatment usual to their class. But the land requires cultivation, and it will be found that the laborers employed upon it are not the tenants of the owner, but that they come from a neighbouring *open* village, perhaps three miles off, where a numerous small proprietary had received them when their cottages were destroyed in the *close* villages "around." Where things are tending to the above result, often the cottages which stand testify, in their unrepaid and wretched condition, to the extinction to which they are doomed. They are seen standing in the various stages of natural decay. While the shelter holds together, the laborer is permitted to rent it; and glad enough he will often be to do so, even at the price of decent lodging. But no repair, no improvement shall it receive, except such as its penniless occupants can supply. And when at last it becomes quite uninhabitable—uninhabitable even according to the humblest standard of serfdom, it will be but one more destroyed cottage, and future poor-rates will be somewhat lightened.

\* In Dr. Hunter's list there are 11 cases, where the word "parish" is applied not to a true parish or township, but to some lesser area, which, for local reasons, has been separately named in the Census, and where, in the remainder of the true parish, the relation of house-room to population has not been that which the heading of Dr. Hunter's table describes.—J.S.

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While great owners are thus escaping from poor-rates through the depopulation of the lands over which they have control, the nearest town or *open* village receives the evicted laborers:—the nearest, I say; but this “nearest” may be three or four miles distant from the farm where the laborer has his daily toil. To that daily toil there will then have to be added, as though it were nothing, the daily need of walking six or eight miles for power of earning his bread. And whatever farm-work is done by his wife and children is done at the same disadvantage. Nor is this nearly all the evil which the distance occasions him.

In the open village, cottage-speculators buy scraps of land which they throng as densely as they can with the cheapest of all possible hovels. And into these wretched habitations (which, even if they adjoin the open country, have some of the worst features of the worst town residences) crowd the agricultural laborers of England. To show what a mockery of accommodation is likely to be the laborer’s lot in the town or open village to which he is driven, I might content myself with referring to almost any page of Dr. Hunter’s report; and if I here particularly call attention to what he writes about Wrestlingworth and Dunton in Bedfordshire, Beenham in Berkshire, Winslow in Buckinghamshire, Gamblingay in Cambridgeshire, Hallingbury in Essex, Madley in Herefordshire, Hartford in Huntingdonshire, Langtoft in Lincolnshire, Lubenham in Leicestershire, Dymock in Gloucestershire, Basingstoke in Hampshire, Floore in Northamptonshire, Stratton in Wiltshire, and Badsey in Worcestershire, I do so merely for the reader’s convenience, and not with any suspicion that these cases are exaggerative illustrations of their class.

It would, however, be unjust to suppose that the relations between the large landowner and the laboring population are universally such as I have described. Dr. Hunter’s report shows many illustrations of landownership exercised in a far different spirit. There are some of the very largest land-properties in the country, where for generations there has been the tradition of a better treatment; where at least no aggression has been made against the house-accommodation

of the poor; where only very low rents are taken; where gardens are commonly given; where deep wells have been sunk; where at least roofs and walls have been kept in sufficient repair; and where, while the landlord has done these things, the tenants, knowing themselves to be secure against eviction, and hoping that their children may succeed to their homesteads, have been encouraged to plant their gardens, to protect their houses against dilapidation, and even to improve the property by occasional necessary out-buildings. Among such estates I may name, as of conspicuous magnitude, the properties of the Dukes of Bedford, Rutland, and Newcastle, and of the Marquis of Exeter. But by instances like those, judgment must not be blinded to the fact that they, in proportion to the mass of observed cases, are altogether exceptional and rare, and that, while our Poor Law continues unaltered in its provisions concerning settlement and chargeability, such instances must tend to become still rarer and more exceptional. For, practically, any future may be foretold from the known interests of those who can control it; and it would be too much to expect that landowners as a class should be the voluntary bearers of a taxation, which the law leaves them option to escape.

Nor on the other hand must it be supposed that, even when the laborer is housed upon the lands which he cultivates, his household circumstances are generally such as his life of productive industry would seem to deserve. Even on such princely estates as those which I have above named, his cottage, though secure to him, may be of the meanest description. In other cases the accommodation which he rents from his employer is often atrociously bad, and at the same time exorbitantly dear. There are landlords who deem any styè good enough for their laborer and his family, and who yet do not disdain to drive with him the hardest possible bargain for rent. It may be but a ruinous one-bedroomed hut, having no fire-grate, no privy, no opening window, no water-supply but the ditch, no garden,—but the laborer is helpless against the wrong. Even the base principle of *caveat emptor* is inapplicable, where a prime necessary of life is

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concerned, and no alternative purchase can be made. And the Nuisances Removal Acts to which he might have wistfully looked for protection against some evil conditions of dwelling, are probably (as will hereafter be seen) a mere dead letter in the district—perhaps in great part dependent for their working on such cottage-owners as the one from whom his hovel is rented.

Here, however, it is again right to observe, that the evil is not universally found. In contrast with the last-drawn picture of a far too frequent phenomenon, many parts of England show the pleasant spectacle of landowners taking real interest in the quality of such cottage-accommodation as they choose to have existing on their estates. Often such landlords have begun the reconstruction of their cottage-property on a scale better suited than the old models to the requirements of an English laboring family. For instances of such re-construction, more or less advanced, I may refer to those parts of Dr. Hunter's report which speak of Lord Londesborough's estates in the East Riding of Yorkshire, Mr. Gurney's in Norfolk, Mr. Palmer's and Mr. Walter's in Berkshire, Mr. Knight's in Kent, and Lord Middleton's in Yorkshire and elsewhere. Dr. Hunter suggests that in some of the above instances the attempt has been made on a scale of even dangerous liberality,—dangerous, because the cost of each such cottage is so great that sufficient numbers of cottages are not likely soon to be built,—dangerous again, because the cottages are of such size and excellence that they are likely to be much desired by well-off classes of the community, and may thus eventually be lost to those for whose occupation they have been built. In other cases the owners have adopted a much cheaper, and under favourable circumstances not less effectual, system of converting rows of decayed cottages, or useless malt-houses, or other farm-buildings, or, here and there, an obsolete parish workhouse, into sets of comfortable cottages, which—as was illustrated in Bucklebury in Berkshire, at Witley in Surrey, and especially on Lord Palmerston's estate near Romsey, may be let at remarkably easy rents.

From these brighter but exceptional scenes, it is requisite in the interests of justice that attention should again be drawn to the overwhelming preponderance of facts which are a reproach to the civilisation of England. Lamentable indeed must be the case, when, notwithstanding all that is evident with regard to the quality of the present accommodation, it is the common conclusion of competent observers, that even the general badness of dwellings is an evil infinitely less urgent than their mere numerical insufficiency. For years, the overcrowding of rural laborers' dwellings has been a matter of deep concern, not only to persons who care for sanitary good, but to persons who care for decent and moral life. For, again and again, in phrases so uniform that they seem stereotyped, reporters on the spread of epidemic disease in rural districts have insisted on the extreme importance of that overcrowding, as an influence which renders it a quite hopeless task to attempt the limiting of any infection which is introduced. And again and again it has been pointed out, that, notwithstanding the many salubrious influences which there are in country life, the crowding which so favours the extension of contagious disease also favours the origination of disease which is not contagious. Those, too, who have denounced the overcrowded state of our rural population have not been silent as to a farther mischief. Even where their primary concern has been only with the injury to health, often almost perforce they have referred to other relations of the subject. In showing how frequently it happens that adult persons of both sexes, married and unmarried, are huddled together in single small sleeping-rooms, their reports have carried the conviction that, under the circumstances they describe, decency must always be outraged, and morality almost of necessity suffer. Thus, for instance, in the Appendix of my last annual Report Dr. Ord, reporting on an outbreak of fever at Wing in Buckinghamshire, mentions how a young man who had come thither from Wingrave with fever, "in the first days of his illness slept in a room with nine other persons. Within a fortnight several of these persons were attacked, and in the course

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" of a few weeks five out of the nine had fever, and one died." And to this passage I appended the following foot note :—  
 " From Dr. Harvey of St. George's Hospital, who on private professional business visited Wing during the time of the epidemic, I received information exactly in the sense of the above report. Two cases of overcrowding which Dr. Harvey observed were the following. A young woman of 19 having fever, lay in a room occupied at night by her father and mother, her bastard child, two young men (her brothers) and her two sisters, each with a bastard child, 10 persons in all. A few weeks ago 13 persons slept in it. In a second house, in the downstairs room (whither they had been moved at the doctor's orders from the bed-room where seven persons ordinarily slept) lay in one bed two young men, and in the other bed the sister with her bastard baby. The lads and women all had fever." Dr. Hunter's report gives innumerable cases of that sort of overcrowding as consequent on the paucity and smallness of dwellings. Doubtless, in some instances, the evil is aggravated by the influence of local industries—straw-plaiting, glove-making, braiding, shoe-making, &c., which are followed as household occupations by young women who otherwise might be in service or married away from home: but, though this influence may occur in aggravation, the main cause of the overcrowding is that which has already been discussed. It is true that neither the provisions of the Common Lodging Houses Act, nor the provisions as to overcrowding contained in the Nuisances Removal Act, are all which could be desired for efficiency in the matters to which they respectively relate: but, apart from their technical insufficiency, and apart from the evident unwillingness which there is to apply them in country districts, it is certain that, while rural house-accommodation is on its present scale, not any statute could easily prevent the evils against which those provisions are directed. Here, as with regard to other main facts of the case, I may cite almost any part of Dr. Hunter's report; but, for perhaps the most general prevalence of the evil, I may refer to his account of the counties of Bedford, Buckingham, Warwick, Oxford, Worcester and Northampton.

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By what enactments or other influences it may be practicable to amend the state of things which I describe from Dr. Hunter's report of the facts is perhaps one of the most difficult problems in our present social economy. And while I feel that it would be irrelevant to the main object of this Report to enter upon the many and various considerations which that question involves, I also very deeply feel that, in an extreme degree and peculiar manner, it requires the wisdom of Parliament for its solution. Only most briefly and tentatively, therefore, would I suggest the direction in which it seems to me that the remedy has to be sought. First (and here I speak more positively than on any part of the subject) it seems indispensable that the Poor Law should no longer offer its present strong inducements for the dislodgement of agricultural laborers from places where their industry is employed. If the Union Chargeability Bill now before Parliament becomes law, those inducements will be in great part removed; and it may fairly be expected that, in prevention of further mischief, the results of the amendment will be very considerable. But if not absolutely necessary in order to arrest the mischief which is now in progress, at least to undo that which has been done, I suspect that more than the one amendment will be wanted. And the ulterior question which will, I think, have to be considered is this,—whether all land which requires labor ought not to be held liable to the obligation of containing a certain proportion of suitable laborers' dwellings. A literal enforcement of that obligation might not indeed always be practicable or expedient. But if the principle of action were understood to be that which I have expressed, means (which need not here be discussed) would soon be found for fairly approximating to it in practice.

The present inquiry concerning the house-accommodation Other laborers. had by the laboring classes of rural districts having been designed by the Lords of the Council to show the facts of the case, not exclusively with regard to the class employed in agriculture, but generally with regard to all classes of rural

Other laborers. laborers, therefore the household-circumstances of mining and colliery populations fell within its scope, as did also the circumstances of that large class of rural population which follows the more migratory kinds of labor. Among these various non-agricultural sections of the rural population, are reached apparently the lowest levels at which a so-called house-accommodation exists.

Miners.

In the mining and colliery districts, it is frequent that large populations are gathered together with scarcely more ædile organization than if the people were but to be tented there for a night. "The extreme badness," says Dr. Hunter, with reference to the northern coal-districts, "is in the high number " of men found in one room; in the smallness of the ground-plot on which a great number of houses are thrust; in the " want of water; in the absence of privies, and in the frequent " placing of one house on the top of another, or distribution " into flats,—a form utterly unfit for working men, and only " justified by the high price of land in large cities." And often the largeness of the local population gives to this case a peculiarity and intensity of evil which cannot be matched, nor easily be approached, in purely agricultural districts. Compendious illustrations to this effect may be seen on referring to Dr. Hunter's account of Risca in Monmouthshire, of Calstock in Cornwall, of Lower Prudhoe in Northumberland, or to Dr. Stevens's independent description of the sanitary circumstances which he found prevailing at the colliery-settlements of Gilesgate Moor [A]; but the magnitude of the evil will not be appreciated, unless it be observed how very frequently that state of things, with only slight shadings of difference, was found by Dr. Hunter in the many districts which he visited of Durham, Northumberland, and Monmouthshire.\* The frequent utter absence of exterior conditions of comfort and decency is the more striking, when it is con-

\* In Derbyshire generally, the circumstances are far better than in the above-mentioned counties; but the case of Whittington, in Derbyshire, may be referred to as sadly illustrative of the sufferings which are entailed on these populations by the absence of proper arrangements for water-supply.—J.S.

trasted with those signs of regard for order and cleanliness Miners. which, in the northern districts, are to be seen in the interior of a collier's dwelling.

In apology for the very wretched household-accommodation with which these populations so frequently exist, it is alleged that mines are commonly worked on lease; that the duration of the lessee's interest (which in collieries is commonly for 21 years) is not so long that he should deem it worth his while to create good accommodation for his laborers, and for the trades-people and others whom the work attracts; that, even if he were disposed to proceed liberally in the matter, this disposition would commonly be defeated by his landlord's tendency to fix on him, as ground-rent, an exorbitant additional charge for the privilege of having on the surface of the ground the decent and comfortable village which the laborers of the subterranean property ought to inhabit; and that this prohibitory price (if not actual prohibition) equally excludes others who might desire to build. It would be foreign to the purpose of this report to enter upon any discussion of the merits of the above apology. Nor here is it even needful to consider where it would be that, if decent accommodation were provided, the cost of providing that accommodation would eventually fall,—whether on landlord, or lessee, or laborer, or public. But in presence of such shameful facts as are vouched for in the annexed reports, a remedy may well be claimed. Wherever may be the eventual incidence of the cost of the better accommodation, clearly it is of public concern that the better accommodation should be given. In principle there seems little real difference between the present case and the case (which I before discussed) of the dislodged agricultural laborers. Claims of landlordship are being so used as to do great public wrong. The landlord in his capacity of mine-owner invites an industrial colony to labor on his estate, and then in his capacity of surface-owner makes it impossible that the laborers whom he collects should find proper lodging where they must live. The lessee meanwhile has no pecuniary motive for resisting that division of the bargain;—well knowing that if its latter conditions be exorbitant, the consequences fall not on him, that his laborers



Miners.

on whom they fall have not education enough to know the value of their sanitary rights, that neither obscenest lodging nor foulest drinking water will be appreciable inducements towards a "strike." Accordingly, for remedying the present state of things, the great desideratum is, that no mine-owner should be able to dissociate from one another the two capacities of his landlordship. It may be that this object would for practical purposes be better attained by indirect than by direct legislation; and that, indeed, the former might be made to guard against some wrongs which the latter would probably let escape. That powers akin to those which Local Boards exercise under the 34th section of the Local Government Act with regard to new buildings should be exerciseable in mining districts by whatever local authority administers the Nuisances Removal Acts,—this, if the local authorities so willed, would render impossible any reproduction of the present evils. And it is scarcely needful to say that meanwhile, if the Nuisances Removal and Common Lodging Houses Acts were properly administered in the mining districts, or, still more, if those statutes were first amended in some particulars where they seem but imperfectly to fulfil the intentions with which the Legislature enacted them, no such scenes could exist as the inspectors describe, of filth, unwholesomeness, and indecency. That mining settlements need not to be the foul, priviless, ill-watered, unscavenged, overcrowded lairs which the inspectors so often found them to be, is shown by Seaton Colliery in the North, by the Duke of Newcastle's at Shireoaks in Notts, by Mr. Cossham's at Pucklechurch, Gloucestershire, and by Mr. Barrow's at Staveley, Derbyshire.

Roving out-door laborers.

As regards the house-accommodation had in country districts by those classes of population which are engaged in migratory labor—as in various building operations, in draining, in the making of bricks, drain-pipes and tiles, in lime-burning, stone-getting, harvesting, &c., no common description can apply. For the lodging which such laborers obtain varies with the customs and circumstances of their labor,—partly according to its longer or shorter duration in any one place, partly according to the degree in which it is organized

under one common command, and so forth. Thus, there are ganging field-laborers—harvesters and the like, who, at their seasons of migratory labor, spend their nights, each one as he best can, sometimes in the open air, sometimes under any farm-shed which will give them shelter, and perhaps but exceptionally in anything that can be termed a house. In a different class of cases again—cases where the industry represents considerable capital, sometimes the undertaker of the work (for instance, the contractor of a piece of railway) provides wooden or other hutting for his men;—creating an extemporaneous village, which is sure to be without constructional appliances for keeping itself wholesome, and is apt to be singularly little cared for in that respect by the local authority of the district in which it stands. In other cases the immigrant laborers get themselves shelter among the permanent population of the place,—sometimes perhaps finding in common lodging houses or elsewhere a little space fairly available for their reception, but far oftener wedging themselves into the already overcrowded dwellings of the poorest section of the population. Whether this be the case, or that they be hutted under auspices of their employer, either way, as a rule, the accommodation will be of the vilest description, and will imply nuisances which endanger the public health. The parts of Dr. Hunter's report which relate to Anthony in Cornwall, Bentley and Market Weighton in Yorkshire, and Thrapston in Northamptonshire, illustrate the household circumstances of migratory labor by instances which probably are not extreme. With the nuisances which immigrant labor commonly implies, sometimes there will be this further serious complication,—that, amid the adventitious throng of population, there is imported some contagious disease under circumstances which peculiarly favour its spread; and severe local epidemics of small-pox, diphtheria, typhoid fever, cholera, typhus, scarlatina, have again and again owed their rise to such contagion from unclean industrial settlements.\* Against

Roving out-door laborers.

\* In illustration of the kind of danger to which my text refers, I quote here two letters of complaint which reached the Lords of the Council in Sept. 1864.—J.S.

(1.) One, addressed to Secretary Sir George Grey by the Chairman of the Nuisances Removal Committee of the parish of Sevenoaks, stated as follows:—

"Small-pox cases were rarely heard of in this parish until about twelve months

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evils like the above—evils which almost invariably tend to co-exist with temporary immigrations of labor,—it is in the

“ago. Shortly before that time the works for a railway from Lewisham to Tunbridge were commenced here, and in addition to the principal works being in the immediate neighbourhood of this town, here was also established the depôt for the whole of the works, so that a large number of persons was of necessity employed here. As cottage accommodation could not be obtained for them all, huts were built in several places along the line of the works by the contractor, Mr. Jay, for their especial occupation. These huts possessed no ventilation nor drainage, and, besides, were necessarily overcrowded, because each occupant had to accommodate lodgers, whatever the number in his own family might be, although there were only two rooms to each tenement. The consequences were, according to the medical report we received, that in the night-time these poor people were compelled to endure all the horror of suffocation to avoid the pestiferous smells arising from the filthy stagnant water, and the privies close under their windows. Complaints were at length made to the Nuisances Removal Committee by a medical gentleman who had occasion to frequent these huts, and he spoke of their condition as dwellings in the most severe terms, and he expressed his fears that some very serious consequences might ensue unless some sanitary measures were adopted. About a year ago Mr. Jay promised to appropriate a hut to which persons in his employ, who were suffering from contagious disease, might be at once removed. He repeated that promise on the 23rd July last, but although since the date of the last promise there have been several cases of small-pox in his huts, and two deaths from the same disease, yet he has taken no steps whatever to carry out his promise. On the 9th September instant, Mr. Kelson, surgeon, reported to me further cases of small-pox in the same huts, and he described their condition as most disgraceful. I should add for your information that an isolated house called the Pest-house, which is set apart for parishioners who might be suffering from infectious diseases, has been continually occupied by such patients for many months past, and is also now occupied; that in one family five children died from small-pox and fever; that from the 1st April to the 1st September this year, a period of five months, there have been no fewer than ten deaths from small-pox in the parish, four of them being in the huts already referred to; that it is impossible to ascertain the exact number of persons who have suffered from that disease, although they are known to be many, from the fact of the families keeping it as private as possible; and that diseased persons have been walking about the town in the daytime with the marks of the disease full out upon them.”—J.S.

(2.) In the other case the Relieving Officer of the Chapel-en-le-Frith Union wrote to the Registrar-General as follows:—“As Relieving Officer of the Chapel-en-le-Frith Union, I beg to report to you that at Doveholes, in the township of Fairfield in the said union, a number of small excavations have been made into a large hillock of lime ashes (the refuse of lime kilns), and which are used as dwellings, and occupied by labourers and others employed in the construction of a railway now in course of construction through that neighbourhood. The excavations are small, and damp, and have no drains or privies about them, and not the slightest means of ventilation except up a hole pulled through the top, and used for a chimney. In consequence of this defect small-pox has been raging for some time, and some deaths have been caused by them.”—J.S.

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highest degree important that local authorities should use full vigilance, and that their hands should be strong enough for the task. And, therefore, in few points of view can it be more important than here to note the evidence which Dr. Hunter's report incidentally contains on the subject of the administration of the Nuisances Removal Acts in the many rural districts which he visited.

## 2. *The Working of the Nuisances Removal Acts.*

In order to a just appreciation of the evidence which the report contains, with regard to the administration of the Nuisances Removal Acts in the places which Dr. Hunter visited, it is essential to remember that an inquiry into the working of those Acts was not a primary object of his inspection. The fact is obvious in his report that very often, where he went, overcrowding was not the only removable cause of disease which he found to be in full local operation. Very often there were other nuisances, and sometimes the magnitude of nuisance was very great. But notes on this subject occur only as it were by accident in his report, and evidently relate only to cases where nuisances forced themselves upon his view in immediate connexion with the main matter of his enquiry. Regard being had to this circumstance, a very high importance must, I think, be understood to belong to the comparative frequency with which he describes conditions of neglected filth; and at any rate the cases are many enough to suggest very strong suspicions, that, with regard even to the most rudimentary and best-understood matters of hygienic police, our law, as it now stands, is far from sufficing for public protection. In this unsatisfactory sense they are supported and rendered conclusive by other evidence which during the last few years has been accumulating before the Lords of the Council; by definite local complaints which have been addressed to their Lordships; by reports of inspectors who have been sent to inquire into outbreaks of disease; and by the very abundant, though not detailed, notes on the subject, which have been made by the inspectors

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of public vaccination in the course of their peregrinations of all parts of England. In the reports and notes to which I advert, is to be found overwhelming proof that our present law is insufficient for its understood purpose. The most various accumulations of animal filth in closest proximity to dwellings, entire absence of drainage, or drains inoperative and stinking, ponds and ditches equivalent to open cesspools, drinking-water polluted and made poisonous with refuse,—such are the evils which (in addition to the unwholesomeness and overcrowding of the dwellings themselves) have constantly been coming under notice of the Lords of the Council, as conditions which local authorities are doing nothing, or nothing adequate, to remove. And, side by side with these conditions, uniformly has been seen the condemnatory, but characteristic, result of their presence,—the result, namely, that among the populations subjected to them, and in due proportion to their prevalence, human life has been overtaxed by those pestilential fevers and fluxes which may most distinctively be named the Filth-Diseases of our climate.

Occasionally, where such has been the state of things, something by way of apology could be advanced. The Nuisances Removal Acts, it must be allowed, are not fully adequate to their purpose; and, in some instances, a local authority accused of non-feasance has been able to allege in excuse that it had been hindered by imperfections of the law. Even the provisions which regulate the constitution of the authority have not universally been found unambiguous.\* So again, as regards the essential officer of the authority—the (quocunque nomine) *inspector* for the purposes of the Acts,—doubts have arisen, whether the “inspector of nuisances” of the Act of 1860 is invested with all the functional attributes of the “sanitary inspector” of the Act of 1855. Above all, the provisions for defrayment of expenses have in several cases been deemed obscure or inapplicable. Especially where works of any magnitude (such, for instance, as sewers) have been necessary, often larger financial powers have been wanted than those which the Nuisances Removal

\* See case of Seacroft [A] as the common case of all Gilbert Unions.—J.S.

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Acts confer; and, in view of this difficulty, the Poor Law Board has deemed it expedient that Boards of Guardians (who, in an immense majority of places are the authority for administering the Acts) should not undertake any such structural works, however needful they may be for the health of the place, but should rather leave open way to an adoption of the Local Government Act.\* And it has been recognized as a very serious defect in the Acts, that the authority has no power, however great may be the need, to provide for the digging of a well.† Moreover, as I have above mentioned, neither by the Nuisances Removal Acts, nor by the Common Lodging Houses Act, is very effectual provision made against the overcrowding of houses.

Often, on the other hand, so far as could be judged from known facts, the inaction of local authorities has been an absolutely inexcusable neglect of duty. Generally it has been so at least in part; for, of the innumerable cases in which there has been pestiferous accumulation of filth about houses, very few can have been those where the local authority, if it had been so minded, might not have abated the nuisance. But this has not been the limit of the wrong. Sometimes statements have been made that the local authority has virtually entered into a collusion against the law which it had undertaken to administer,—that Nuisances Removal Committees have continued in office in order to prevent nuisances from being removed,—that inspectors of nuisances have been appointed on terms that implied a minimum of inspection to be required of them,—and so forth. And as confirmatory of such statements, it certainly deserves notice that some of the worst instances of neglect which have come under observation of the department have been cases where the appointed administrators of the law had kept its word of promise to the ear,—cases where committees and inspectors nominally existed, or even where the ample powers of the Local Government Act had been accepted by the authority.

\* See Glen's Law of Public Health, pp. 508.—J.S.

† See, for instance, in my last report, the circumstances under which the village of Wing could not look to its authority for the provision of a proper public well.—J.S.



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the Nuisances  
Removal Acts.

Under the above circumstances, it seems necessary that the extensive inoperativeness of the Nuisances Removal Acts should receive the attention of the Legislature. And in this point of view it may be desirable that I should here submit for consideration certain changes by which in my opinion these Acts, and other Acts which are of kindred purpose with them, might best be converted into laws which would be effectual for the public safety.

In the first place, of course, all ambiguities as to the constitution of local authorities, and as to the duties of officers, and as to the defrayment of expenses, would need to be cleared up.

Next, with regard to certain prime sanitary objects—objects which never ought to be unattainable in any place where population may gather at all densely,—I would suggest that every local authority administering the Nuisances Removal Law should have exactly the same powers as are exercised by Local Boards under the Local Government Act. The powers which in my opinion ought to be thus equally held by all authorities acting for sanitary purposes are those powers (financial and other) whereby Local Boards are enabled to provide for and enforce wholesome cleanliness within their districts,—especially such powers as the Local Government Act confers for purposes of sewerage, draining and water-supply, and of public scavenging and cleansing, and of removal of house-refuse and other filth. And with this extension of the powers of common local authorities, it would in my opinion be desirable that the definition of the word “nuisance” in the Nuisances Removal Acts should be so extended as to cover the case of a district which is left without proper constructions and arrangements for wholesome cleanliness.

Thirdly, with regard to these elementary necessities of health, I venture to submit that the time has now arrived when it ought not any longer to be discretionary in a place, whether the place shall be kept filthily or not. Powers sufficient for the local protection of the public health having first been universally conferred, it next, I submit, ought universally to be an obligation on the local authorities that those powers be exercised in good faith, and with reasonable vigor and intelligence. Though perhaps not of strict legal

necessity, yet for convenience of common interpretation it seems desirable that the language of the law, besides making it a *power*, should also name it a *duty*, of local authorities to proceed for the removal of nuisances to which their attention is drawn; that thus, obviously to every one, any extreme sanitary neglect in a district should be an evil for which the Court of Queen’s Bench, with its ordinary machinery of mandamus, could apply a remedy. And I would suggest that this remedy should in fitting cases be obtainable, either on the complaint of an aggrieved person, or on the motion of some appointed public complainant.

Fourthly, if the above-suggested changes were made, it would, in connexion with them, be desirable that facilities should be given for the creation of special *Nuisances Removal Districts*, by some such process as that which now creates districts under the Local Government Act. Particularly as regards large and heterogeneous Unions (such as now often are single sanitary jurisdictions) it would be much for the convenience of the Boards of Guardians, that the Secretary of State should, on the motion of the Guardians or otherwise, be able to divide the area into separate Nuisances Removal Districts, whereof each would then be governed, for sanitary purposes, by an elected Board of its own.

It would be superfluous for me here to specify the many minor amendments which, in addition to the above-suggested changes, are, in my opinion, needful for converting our present Nuisances Removal Acts into that which doubtless the Legislature intends them to be—an efficient sanitary law for all common purposes of the country. But as further points, where, in my opinion, amendment is particularly required, I may name the following:—(1) The absence of special provisions for the regulation of such work-places as are not under the Factory Law; (2) the want of precision and efficiency in the law relative to over-crowded dwellings; (3) the absence of provision, generally in the country, against the construction of houses unfit for healthy habitation; (4) the absence of reasonable restriction, summarily enforceable, on the frequentage of public places by persons suffering from dangerous infectious diseases; and (5) the absence of convenient local

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jurisdiction over the sanitary state of ships coming into relation with populous places. Partly with reference to some of the above points, and partly with reference to others which I do not here separately mention, I append [A] a memorandum with which, at my request, the Medical Officers of Health of the Metropolis have favoured me, stating where, in their experience, the health-statutes have been shown to require amendment. And I beg to refer to that memorandum, as representing the largest experience which can be quoted with regard to the present insufficiencies of the law for the purposes of large urban populations.

### 3. *Parasitic Diseases in Animals used for Food.*

Parasitic  
diseases in  
animals used  
for food.

In furtherance of an important object proposed by their Lordships in 1862—the object of getting due knowledge as to the states of disease by which animal food is rendered unfit for human consumption, and with particular reference to certain recent advances of scientific experience in some branches of the subject,—my Lords in 1864 ordered inquiry to be made as to the prevalence of parasitic disease (and especially of the so-called *trichina spiralis*) in the meat of the London markets, and as to the danger which such disease implies of infection of the human consumer. Dr. Thudichum was employed on this inquiry, and has furnished a report [A] on the subject in all its relations.

In my fifth report two years ago I submitted to their Lordships my then information on the practical bearings of the parasitic diseases of animals which are used for food. [See above, pages 75–90.]

During the two years which have elapsed since the presentation of my fifth report, progress has in many respects been made in knowledge of animal parasites, and especially a mass of most important experience has been collected with regard to the *trichina spiralis*. This microscopical thread-worm has suddenly been shown to be of unsuspected importance to man. Happily not yet in England, but in several instances in Germany, the consumption of trichinous pork has been found at the root of local epidemics which of old

would doubtless have been confounded with fever. It was by the alarming significance of one particular occurrence of that kind in Germany in the autumn of 1863, that my Lords were induced to order the present special inquiry. In the little town of Hettstädt in Prussian Saxony, the utilisation of one trichinous pig (chiefly in festive celebration of the battle of Leipzig) had led to an epidemic of human trichiniasis wherein there were at least 158 sufferers, and no fewer than 28 deaths; and not even the Schleswig-Holstein excitement of last year prevented Germany, high and low, from recognising almost tumultuously that the physiology of the *trichina spiralis* was a question of great importance to the nation. How important, may be judged from those pages of Dr. Thudichum's report which tell of the Hettstädt epidemic, or by reflection on the fact that doubts were currently expressed whether the use of so staple an article of diet as pork ought not to be absolutely discontinued. The importance of the subject is likely to be less in England than in Germany, because in England that consumption of uncooked or imperfectly cooked pork which favours the ingestion of live trichinæ is vastly less frequent than in Germany; and, moreover, up to the present time trichinous swine do not seem to be of frequent occurrence in England. Still, in face of the circumstances to which I have referred, no apology will be needed for the very considerable extension which it has been thought desirable Dr. Thudichum should give to those parts of his report which relate to a parasite so dangerous and so easily overlooked. Indeed, altogether it has seemed expedient so to treat the whole subject of the parasitic diseases of stock, that the report may be referred to—and especially for medical purposes, as a monograph on that subject, and of course predominantly on its less familiar parts. It is with this view that the physiology of each parasite mentioned in the report has been discussed there at some little length; and that, in regard of trichiniasis—a subject almost new to this country—masses of detail are given (both from German experience, and from Dr. Thudichum's own observations) to illustrate the habits of the parasite, and especially the laws of its reproduction and migration, and the circumstances under which man is likely

Parasitic dis-  
eases in animals  
used for food.

Parasitic diseases in animals used for food.

to be infected by it, and the symptoms which result from its presence in the human body, and the ways in which trichiniasis may be distinguished from the diseases which it most nearly resembles.

### From the Eighth Report to the Privy Council, 1865.

[The Eighth Report comprises:—A section relating to Public Vaccination which has appeared in Vol. I., pp. 364-6; a section relating to the "Distribution of Disease in England," subdivided into (A) systematic proceedings and (B) occasional proceedings; a section relating to Foreign Epidemics of the year and the general question of Contagion in its bearings on the Public Health.—ED.]

#### DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED—*cont.*

##### (A) *Systematic Proceedings.*

In pursuance of the systematic study which my Lords have for several past years had in progress in this department, as to the distribution of disease in England, and as to the circumstances by which the distribution is regulated, their Lordships in 1865 ordered some additional inquiries, generally of the same kind as heretofore, to be undertaken, and also, in one respect, opened a new line of investigation.

House accommodation of the poor.

1. Of these inquiries, so far as finished within the year, the largest related to the *Housing of the Poorer Population in Towns*. In general intention this inquiry harmonised with one which had just before been made into the housing of the Rural Poor. Both were undertaken with reference to projected amendments of the Public Health Law, and had for their chief object to ascertain how far that law in its present state enables local authorities to prevent dangerous degrees of overcrowding in dwellings, and the use of dwellings unfit for human habitation. In proceeding to investigate these

questions, particularly in the present urban field of inquiry, an important distinction had to be observed. Wherever the evils in question should be found existing, heed would have to be given whether the authority was powerless to prevent them, or was merely unwilling to exercise its powers; and, as powers for sanitary purposes are not in all places—especially not in all towns—the same, it would be necessary to distinguish places where the Local Government Act is in operation, or where special powers have been given by particular local Acts of Parliament, from places where only the general statutes are in force. Likewise the possibility would have to be regarded (and in the event this was abundantly realized) that in different places there might be different modes of interpreting the law. So the present urban inquiry was planned on a large scale. Besides dealing with the metropolis, and including (for important purposes of comparison) some examination of places in Scotland, it extended in extra-metropolitan England to fifty of our chief centres of population. Dr. Hunter was the inspector employed upon the inquiry.

Large as the inquiry was, and copious as are the resulting details of information, the broad results may be told in these very few words,—that, neither against degrees of crowding which conduce immensely to the multiplication of disease, as well as to obvious moral evils, nor against the use of dwellings which are permanently unfit for human habitation, can local authorities in towns, except to a certain extent in some privileged places, exercise any effectual control. Resulting from (or at least attributable to) this powerlessness of the authorities, which only sometimes was supplemented by strained constructions of the law, the evils in question were found very extensively, one or both of them, in operation. Especially they were seen abounding in some of the chief places which were visited; perhaps worst in parts of the metropolis, and in Bristol, Merthyr, Newcastle, Plymouth and Sunderland. Moreover, though in various other places, including some of considerable importance, the evils were either not found existing, or not in important degrees, it must be remembered that even in these places, or in most of

House accommodation of the poor.



House accom-  
modation of  
the poor.

them, slight industrial or other local changes could rapidly and irresistibly develop high degrees of overcrowding. Adverting also to my last annual report, I may recall the fact, therein abundantly demonstrated, that even in small country towns and villages, where the evil least admits of excuse, overcrowding is often in glaring excess. And thus, speaking generally, it may be said that the evils are uncontrolled in England.

No one, I apprehend, can doubt but that this state of things contravenes the intentions of the Legislature. For when regard is had to the enactments already made in the matter—especially to the Common Lodging Houses Acts, and to those provisions of the Nuisances Removal Act which relate to overcrowding and to dwellings unfit to be inhabited, the Legislature is seen to have decided in principle that the evils in question must not be suffered to continue. And the fact that the evils do nevertheless continue, both in wide extent and often in great intensity, constitutes an evident and urgent claim for such new legislation as will amend the present technical insufficiencies of the law.

It is scarcely possible for the better-off classes to imagine, where duty has not given them opportunities of practically knowing, what immensity of baneful influence is included in the evils to which I advert; and it may therefore be well for me to show what in practice are the forms in which the evils present themselves. By places "unfit for human habitation" I mean places in which by common consent even moderately healthy life is impossible to human dwellers,—places which therefore in themselves (independently of removable filth which may be about them) answer to the common conception of "nuisances";—such, for instance, as those underground and other dwellings which permanently are almost or entirely dark and unventilable; and dwellings which are in such constructional partnership with public privies, or other depositaries of filth, that their very sources of ventilation are essentially offensive and injurious; and dwellings which have such relations to local drainage that they are habitually soaked into by water or sewage; and so forth. But beyond these instances where the dwelling would, I think, even now be

deemed by common consent "unfit for human habitation," instances, varying in degree, are innumerable, where, in small closed courts, surrounded by high buildings, and approached by narrow and perhaps winding gangways, houses of the meanest sort stand, acre after acre of them, back to back, shut from all enjoyment of light and air, with but privies and dustbins to look upon; and surely such can only be counted "fit for human habitation" while the standard of that humanity is low. Again, by "overcrowded" dwellings I mean those where dwellers are in such proportion to dwelling-space that no obtainable quantity of ventilation will keep the air of the dwelling-space free from hurtfully large accumulations of animal effluvia,—cases, where the dwelling-space at its best stinks more or less with decomposing human excretions, and where, at its worst, this filthy atmosphere may (and very often does) have, working and spreading within it, the taint of some contagious fever.\* And as a particular class of cases, in which both evils are combined to one monstrous form of nuisance, I ought expressly to mention certain of the so-called "tenement-houses" of the poor; especially those large but ill-circumstanced houses, once perhaps wealthy inhabited, but now pauperised, and often without a span of court-yard either front or back; where in each house perhaps a dozen or more rooms are separately let to a dozen or more families—each family with but a room to itself and perhaps lodgers; and where in each house the entire large number of occupants (which even in England may be little short of a

\* Though my official point of view is one exclusively physical, common humanity requires that the other aspect of this evil should not be ignored. For where "overcrowding" exists in its sanitary sense, almost always it exists even more perniciously in certain moral senses. In its higher degrees it almost necessarily involves such negation of all delicacy, such unclean confusion of bodies and bodily functions, such mutual exposure of animal and sexual nakednesses, as is rather bestial than human. To be subject to these influences is a degradation which must become deeper and deeper for those on whom it continues to work. To children who are born under its curse it must often be a very baptism into infamy. And beyond all measure hopeless is the wish that persons thus circumstanced should ever in other respects aspire to that atmosphere of civilization which has its essence in physical and moral cleanliness, and enhances the self-respect which it betokens.—J.S.

House accom-  
modation of  
the poor.

hundred) will necessarily have the use of but a single staircase, and of a privy which perhaps is placed in the cellar.\*

That such influences as the above must be enormously fatal to health is, in the present state of knowledge, too obvious to need formal demonstration. When first, seventeen years ago, it devolved upon me (then officer of health for the city of London) to draw attention to the sanitary circumstances of great masses of metropolitan population, I showed, in regard of my then sphere of observation, that those evils were sufficient in their gigantic magnitude to neutralise whatever in other respects was being attempted for the improvement of health.† And now I am confident that I speak the sense of all who have had most to do with the administration of sanitary measures or poor law medical relief, when I affirm generally what was then but of partial application, and say that to provide for the public health in important centres of population must of necessity be a hopeless task, unless the administering authority be armed with ample powers to render impossible those conditions of lodgment which are of so deadly effect upon the poor. Not only Dr. Hunter's present report, written specially on the subject, but other of our departmental reports,‡ and, in addition to them, masses of independent evidence set before the public by persons officially

\* Mere scantiness of privy-accommodation leads, of course, to filthy habits among the lodgers of crowded tenement-houses. And when the pretended accommodation is given in the above-described form, often in utter darkness, the likelihood is that the basement of the house will be one indescribable quagmire of filth.—J.S.

† See Extracts from Reports, relating to the sanitary condition of the city of London, 1849 and 1850. Vol. I., p. 35.—J.S.

‡ See, for instance, in the Appendix to my Sixth Report the description which Dr. Stevens gives of the town of Cockermouth, and that which Dr. Bristowe gives of Whitehaven, as regards the dwellings of the labouring classes; also, in the Appendix to my Seventh Report Dr. Buchanan's statements as to the construction and overcrowding of the homes of the poor in Liverpool. Dr. Hunter's report in the same volume (on the house accommodation of rural labourers) gives, in relation to smaller places, innumerable pictures of overcrowding, and of such style of dwelling as are only borne in despair of better. See also in Seventh Report, Appendix, Dr. Stevens's account of the colliery settlements at Gilesgate Moor. And in the Eighth Report (Appendix) Dr. Buchanan on fever at Greenock.—J.S.

or unofficially interested in sanitary improvement,\* may be referred to for details in justification of that statement. And in Dr. Hunter's report will be found illustrated all those ambiguities or insufficiencies of law through which the evils in question are maintained.

The powers which, in the interests of our labouring population, it is most of all desirable that local authorities should be able and willing to exercise against the evils in question, are, in my opinion, these:—

(i.) to deal universally with overcrowding on the basis of its being technically a "nuisance," and to take, as the sole test of overcrowding, the proportion borne by number of occupants to size and ventilation of given space; †

(ii.) to apply to the so-called "tenement-houses" ‡ of the poor a system of registration and regulation akin to that

\* I may particularly refer to the testimony of medical officers of health, especially those acting for the metropolis and Liverpool and Glasgow, and to Mr. Rendle's very impressive pamphlet (1865) on London Vestries and their sanitary work, and to the letters which have from time to time, within the last year or two, been written to the "Times" by Dr. Jeaffreson, Resident Physician of the London Fever Hospital, on the sources and distribution of typhus in the metropolis.—J.S.

† I think it practically important that in the letter of the law no distinction should be drawn whether overcrowders are of one family or more. Otherwise technical difficulties become insuperable. For what is a "family"? In one sense it means "children with their parents," but in another sense it may be extended to an entire clan. It may fairly be left open to magistrates (as a matter for discretion according to local and particular circumstances) to refrain from ordering the abatement of a given overcrowding if they see that it is of one family, and could not be abated without hardship. Further, in my opinion, it is to be desired that laws and regulations as to overcrowding should not proceed on the assumption that children (to any measurable extent) require less breathing-space than adults. Against any such assumption two facts have to be considered;—first, that even healthy children, in proportion to their respective bodily weights, are about twice as powerful as adults in deteriorating the air which they breathe; secondly, that the children will almost invariably have certain eruptive and other febrile disorders to pass through, from which adult life is comparatively exempt, and in which the requirement of space is greatly increased. And having regard to these two considerations, I think it best that children and adults should be deemed to require equal allowances of air and ventilation.—J.S.

‡ How to define the above-mentioned class of houses is a question which perhaps, ought to be noticed. "Tenement-house" is an expression applied to certain houses in respect of their being let or occupied in two or more "tenements." The term, if it were not expressly limited, would include all houses in which "flats" and other "chambers" are let. If it were thought

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which is applied to common lodging houses under the statutes of 1851 and 1853;\*

(iii.) to enforce every where against the use of cellar-dwellings the restrictions which, under the 67th section of the Public Health Act, 1848, are enforceable in places which are under that Act and the Local Government Act;

(iv.) to exercise against premises or parts of premises which by want of access of light or air, or by dampness or through ruinous condition, are rendered unfit for human habitation,

well, in any such provisions as I suggest, expressly to exempt houses of the richer sort (where of course the restrictions in question are not practically needed), this might easily be done by exempting all tenement-houses wherein tenements are separately rated, or wherein no tenement is let at a lower rent than (say) six shillings per week. Practically the "tenement-houses of the poor," so far as it is my object to provide for their registration and regulation, may be regarded as houses of the worst quality, in the worst localities, and with the worst provisions for cleanliness, occupied dividedly by as many, or nearly as many, families as they have rooms; so that each room, or, in rarer cases, each pair of rooms, is a family-holding, into which sometimes lodgers are received.—J.S.

\* For the success of such a system as is proposed, powers which could not be dispensed with are these:—power to prevent the occupation of a house in several holdings, so long as its privy-accommodation and other means and appliances of cleanliness, and the ventilation and lighting of its common staircases and passages, are not such as to fit it for that kind of occupation:—power to fix for a house, according to its size, situation, construction, and conveniences, the number of holdings which may be separately let or occupied in the house, and the number of persons who may be received into any given holding:—power to require the same cleansings and limewhitings as are appointed for common lodging houses by the 13th section of the Act of 1851. Power, such as is given in regard of common lodging houses by the 7th section of the Act of 1853, to remove, in certain cases, persons who have fever or other infectious or contagious disease, is one which in the present state and circumstances of tenement-occupation, is often most urgently required. But if the preceding powers were duly exercised, this would be comparatively superfluous, and for obvious reasons only extreme circumstances could justify its exercise where the interference would be with purely domestic relations. The same remarks apply to the power (not given by the Lodging Houses Acts, but given, for instance, as regards the city of London, by the 90th section of the City Sewers Act) to cause in certain cases the removal of dead bodies from within houses. Of course in the case of tenement-houses provision would not have to be made for such reports as are ordered by section 8 of the Common Lodgings Act of 1853, nor for "separation of the sexes" in the sense of the statute of 1851. If it were deemed necessary to limit the power which I have named second in my list, a reasonable limitation of it would, I think, be this;—that every holding which has adequate provision for ventilation, and is not in a closed court, nor closely surrounded by buildings higher than itself, nor one of more than three holdings in the same house, should be deemed of size sufficient for its occupation, if its interior space (exclusive of lobbies, cupboards, and the like) affords to each man, woman, and child occupying it an

the same powers as against premises which by "nuisances" are rendered unfit;\*

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(v.) to acquire premises, by compulsory sale, either in order to make needful openings and clearings where ground is too closely built upon, or for other sanitary improvements.

Exercising compulsory powers like the above, and therewith, so far as circumstances require, such powers as the Labouring Classes Dwellings Bill now before Parliament proposes to confer for the construction of new habitations, local authorities would in very few years bring within conditions of decency and comfort myriads who now subsist under conditions which it is dreadful to contemplate. And as regards the accordability by the Legislature of such restrictive and compulsory powers as I have proposed, I venture to submit two arguments:—first (as I have already stated), that the objects which such legislation would tend to compass are objects for which, in principle, the Legislature has already declared itself; and, secondly, that each of the powers which I name, as powers universally to be desired, is a power already legally exercised in some part or other of the country. In the latter point of view I would particularly beg leave to refer to the improvement-powers which are exercised in Liverpool under the local Act of 1864, and in Scotland under section 161 of the Scotch Police and Improvement Act; also to the powers which, in Glasgow under the local Police Act of 1862, and especially under its sections 384–8, in the city of Dublin under the 24th section of the Dublin Improvement Acts Amendment Act, 1841, and in the city of London under the City Sewers Act, 1851, are exercised against the crowding of tenement-houses.

average of 500 cubic feet per head; and that in no case the authority should be entitled to require a larger allowance as aforesaid than 1,000 cubic feet per head.—J.S.

\* At present in respect of premises where "nuisances" exist—i.e., nuisances of the sorts enumerated in the 8th section of the Act of 1855, justices can, if they think it necessary, prohibit the using of the premises till the nuisance in question is removed; but there seems to be some difference of opinion whether the very serious constructional faults to which the above text refers—faults, which in their higher degrees ought absolutely to disqualify premises from being inhabited, are in the present law, technically a "nuisance."—J.S.



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In concluding this section of my report, there are two more observations which I would venture to submit. In the first place, with regard to some of the worst conditions of dwelling in towns, it is scarcely possible that thorough reforms should be accomplished, unless large improvement-powers are in the hands of the local authorities, and are so exercised by them as gradually (by the requisite clearings of ground) to provide light and air for masses of population who now dwell in dark and unventilated places, or, where such clearings cannot be made, to purchase and destroy the poorer dwellings as "unfit for human habitation," and to provide equivalent new dwelling-space in the suburbs of the town:—and I am glad to mention here two cases, where munificent beginnings of this sort are being made; Liverpool, where 100,000*l.* has been voted and is in course of being expended, for that one purpose; and Glasgow, which is now asking Parliament to sanction its spending within the next twenty years no less a sum than 1,250,000*l.* on improvement-purposes in great part similar. In the second place, I would advert to the uncompensated dislodgment and inconvenience which the laboring classes from time to time suffer through the destruction of parts of towns required for railways and other public purposes, in which parts they have hitherto had their homes. And I would suggest for consideration whether, when compulsory powers of purchase are being sought of Parliament for purposes of the above description, it would not be desirable that the local authority which is exercising improvement-powers on behalf of the laboring classes (and also perhaps individuals interested, as employers of many hands, or otherwise, in the well-doing of work-people) should have a *locus standi* for opposing the grant of such powers, except on condition that where many habitations are destroyed at least as many should be substituted for them. On this subject I beg leave to quote, as of the highest authority which special legal experience in such questions can give, an expression of opinion with which I have been favoured by Mr. John Bullar:—"It has been objected that it is "foreign from the objects of (for instance) a railway company to make them house speculators, and force them

"to lock up part of their capital in dwellings for the laboring classes; but this objection is altogether futile. "Where it suits the interests of the shareholders, a railway company may add to their railway a canal, a dock, a harbour, a toll-bridge, a toll-road, or an hotel; and railway companies not only may, but in countless cases must, expend capital in making, and income in maintaining, for the landowners whose lands they touch, roads, sewers, drains, level crossings, bridges, cattle-creeps, watering-places, fences, and sometimes capital in providing farm buildings. The Lands and Railway Clauses Acts provide that ample compensation in money or works or both shall be made to landowners whose interests are interfered with, but do not make adequate provision for protecting the poor, whose means of living may be seriously lessened by the exercise of the powers of those Acts. There is nothing inconsistent with the course of legislation for public works that their undertakers should build as many houses as they pull down, just as they make a new piece of road where they block up the old road; and there is no reason why they should not sell their houses as soon as they think fit. The Lands Clauses Act requires them to sell within ten years after the completion of their works. If they lose by the sale the amount of the loss is the amount of the compensation unproductive to themselves which they make to the poor whom they dispossess; but with ordinary prudence they often may so arrange their building and selling operations as, if not to give them a profit, at least to make their loss a most insignificant part of their total outlay."

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2. A second large inquiry which my Lords undertook in 1865, but which could not within the year be completed, related to places in which, for some considerable number of years, proper works of drainage and water-supply have been established, or particular sanitary regulations been in force, and aimed at ascertaining, by local inquiries and examination of mortuary returns, what has been the *effect of the works or regulations in improving health* in each respective place.

Effect of sani-  
tary improve-  
ments.

Effect of sanitary improvements.

Dr. Buchanan is the inspector who has been employed on this inquiry. The places in which hitherto his investigations have been made—certain places, namely, in which the Public Health Act had been long adopted, and sanitary works under it had been constructed, are as follows:—Salisbury, Macclesfield, Croydon, Alnwick, Penrith, Morpeth, Ely, Ashby-de-la-Zouch, Carlisle, Leicester, Rugby, Stratford-on-Avon, Banbury, Warwick. His reports on these places have reached me too late to admit of their being included in the volume for this year, 1865. Both on this account, and also because the inquiry is being extended to other places, I think it best now to refrain from putting forward the conclusions which hitherto seem probable results of the inquiry. But I hope that in my next report I shall be able to present all the evidence which this inquiry aims at collecting, and at the same time to state conclusions which may be permanently valid (and I believe will be highly interesting) as to the practical fruit of our best-tested sanitary improvements.

Question of injury from infected rags.

3. With a view to obtain, if possible, more exact knowledge than was hitherto existing as to one particular alleged cause of disease—the *alleged occasional conveyance*, namely, of morbid contagia in the various stuffs which form the staple of the rag trade, I, under their Lordships' orders, instructed Dr. Bristowe to make detailed inquiry in quarters where affirmative evidence, if producible, would most readily be found, and especially in great paper-making establishments, as to any known facts which might seem to justify the suspicion referred to.

Dr. Bristowe, after visiting many establishments in London of rag merchants and marine storedealers, and 86 paper mills, scattered in various counties of England, gave me the report which I append [A].

It is matter for congratulation that the results there recorded are almost entirely negative, and such, I think, as fully to establish that the rag-trade does not play any considerable part in the distribution of contagions of disease. More than this cannot, I apprehend, be maintained. When

regard is had, on the one hand, to the sources of rag-supply, and on the other hand to the known properties of certain contagia, no one can suppose that paper-mills do not sometimes receive rags with infective material among them; and it would not have surprised me, if cases more or less authentic had been reported, where not only smallpox and other fevers, but also syphilitic inoculations, had, on particular occasions, been ascribed to the agency of foul rags. It will be observed, however, that, except in regard of smallpox, no such accusations came under the inspector's notice; and the instances wherein it was with some show of probability alleged that smallpox had been introduced by rags cannot be deemed to represent, in a vaccinated country, any serious amount of public danger.

I have already elsewhere submitted my opinion (and must hereafter return to the point) that the Nuisances Removal law of the country requires to be strengthened by provisions, which may be summarily used, against such sorts of personal conduct as tend unnecessarily to spread dangerous infections of disease.\* It seems to me that if provisions with that object are to exist, the offence of knowingly contributing to circulate rags which have been imbued with infectious material would almost of course fall within their scope. And, so far as present information extends, nothing further than that could be desired in the way of legislative precaution against the danger.

4. It remains to be mentioned under the present head that, in aid of the more immediately practical objects of the department, my Lords, early in 1865, ordered certain *scientific researches* to be begun. Inquiries already made and reported on had set before the Legislature and the public much information, collected according to the current lights of medical science, with regard to the distribution and causes of all our most destructive diseases. The relations of typhoid fever and other diarrhoeal infections to the presence and decomposition of excremental impurity in air and water,—the

\* See below, pp. 248-52, last section of Report.—J.S.

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researches.

relation of the most fatal afflictions of artisan life to mere want of common ventilation, or of dust-withdrawing ventilation, in places of industry,—the relation, similarly, of miners' lung-diseases to the insufficient ventilation of mines,—the relation of our highest infantine death-rates to that neglect of infants, too often an almost murderous neglect, which follows the extensive industrial employment of women, whether in factories or in gang-agriculture,—the relations of unconquered smallpox to ill-performed vaccination, and of this to demonstrable faults of local arrangement,—the relations of contagion to the spread of disease in different circumstances of life, and of overcrowding to the power of contagion,—these very important ætiological relations had been studied, in their broadest bearings, in a large number and variety of local inspections throughout England, as well as in elaborate mortuary statistics; and the results of the study had been laid before Parliament, with other sanitary information, in the successive annual reports of the department. My Lords had now to determine what was to be done in the way of further like proceedings. It was submitted to them that by renewed inquiries, of exactly the same kind as heretofore, they might extend, but perhaps not importantly strengthen for practical purposes, the evidence already elicited on the great subjects which had been in hand; and that inquiries, tending chiefly to produce repetitions of evidence, would be but of secondary interest. Also it was submitted that, in the establishment of new principles for the prevention of disease, great steps of progress were now not likely to be made otherwise than with improved methods of ætiological observation;—that scientific researches must first have created a far more intimate knowledge than is yet current as to the nature of the morbid processes which are to be prevented, and as to the physical and chemical conditions of their development;—that such researches, on the scale and system which were to be desired, were not likely to be undertaken here by private investigators;—that, if their Lordships' inquiries were to continue to give fruit of national interest and importance, collateral work, aiming at such knowledge as I have just

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researches.

spoken of, must be combined with their Lordships' former line of inquiry, and serve hereafter in some sort as its pioneer.\*

My Lords having instructed me to act in accordance with these views, investigations of the kind in question became in 1865 part of the work of the department. Hitherto they have had relation only to the chemical processes of disease, and here, under their Lordships' authority, I have had the advantage of Dr. Thudichum's assistance. At present I have only to name these investigations as of the category of work in progress. On future occasions I shall hope to particularise the proceedings, so far as their very technical subject-matter will permit, and of course from time to time to give their practical results. It may be, however, that these will not so much admit of popular appreciation as they will conduce to urgent professional requirements. The work is not of the kind which can promise either immediate returns, or such returns as are most popularly striking. But that medicine in its most practical aspects, whether preventive or curative, needs constant aid and guidance from purely scientific researches, is a fact on which it would be superfluous to insist. Of the convictions which in this respect are universal among enlightened persons, perhaps no stronger illustration could be cited than the urgency, almost the clamour, with which such researches were recently called for in relation to the steppe-murrain now in England, and the scale on which the Royal Cattle-Plague Commission ordered them. Also in another point of view I may refer to those researches for an illustration. Undertaken as they were in the medical interests of horned cattle, they yet elucidated some processes of disease in a way which is of interest to

\* In relation to one very important disease, opinions like the above had, ten years previously, been pressed upon the attention of Government by the Medical Council, which the President of the then General Board of Health had called together to advise him on the then prevailing epidemic of Asiatic cholera. See Report of Medical Council, p. 8, and Report of the Council's Committee for Scientific Inquiries, pp. 65-6, among papers of General Board of Health laid before Parliament with reference to the Cholera-Epidemic of 1853-4. But cholera is only one of innumerable illustrations which might be adduced of our present practical standstill for want of deeper scientific insight.—J.S.



human pathology, and, through it, to the preventive medicine of mankind.\*

(B) *Occasional Proceedings.*

Occasional  
proceedings.

Besides inquiries systematically contributed as aforesaid to elucidate the common sanitary state and circumstances of the country, miscellaneous inquiries, which of course have tended to increase knowledge in the same direction, were made on many particular occasions, and generally at the instigation of local applicants, either with reference to actual excesses of disease, or with reference to conditions of filth from which such excesses might result. On occasions of the one sort or the other, my Lords, during 1865, ordered that inspectors should visit the following places:—*Greenock* and *Bristol*, where in both instances typhus was epidemic, and the local authorities requested my Lords to assist them by inquiry and advice; *Maidenhead*, where there was a very unusual concurrence of deaths by puerperal fever; *Great Ormesby* and *Waltham Abbey*, where there had been outbreaks of diphtheria; *Wellington* and *Aston Clinton*, where scarlatina had caused anxiety; *Harting* and *Hadlow*, where there had been typhoid fever; *Southampton* and *Epping*, where cases of Asiatic cholera had shown themselves, and, in connexion with the inspection of *Epping*, *Leytonstone*, where a drainage-nuisance was much complained of; *Swansea*, where cases of yellow fever had occurred; *Chichester*, *Leeds* and *Harwich*, where question had arisen as to the sufficiency of action taken by the local authorities for the protection of the public health. In *Woolwich*, where fever had been epidemic, an inquiry which had been begun in 1864, and which therefore my last Report mentioned as in progress at the end of the year, was completed. And besides the above cases, where local inspections were made, my Lords, on other occasions of local complaint or alarm, had written communication with the authorities of these other places, viz.:—*Newton* in the *Chesterton* Union, *Deptford*,

\* I refer particularly to the researches of Dr. Sanderson (reported in the Appendix to the Third Report of the Royal Cattle Plague Commission) on the propagability and incubation of cattle-plague, and on the physical state of its contagium.—J.S.

*Paddington*, *St. Pancras*, *Farnham*, *Horfield* in the *Clifton* Union, *Debenham* in the *Bosmere* and *Claydon* Union, *Waltham Abbey*, *Bethnal Green*, *Colney Hatch*, *Camberwell*, *Shirley*, *Whitstable*, *Bury*, *Golborne* in the *Leigh* Union, *Wistanstow* in the *Church Stretton* Union, *Silver Hill* in the *Hastings* Union, *Birling*, *Aylesford*, *Brundall* and *Bradestone* in the *Blofield* Union, *Watlington* in the *Henley* Union, *Standon* in the *Ware* Union, *Maidenhead*, *Ramsey* in the *Huntingdon* Union, *Child's Hill* in the *Hendon* Union, *Otley*, *New Shoreham*, *Burton-on-Trent*, *Headcorn* in the *Hollingbourne* Union, *Tottenham*, *Twickenham*, *Maidstone*, *Easingstoke*, *Enfield*, *South Shields*, *Wing*, *Kensington*, *Clapton*, *Hounslow*, *Cleator*.

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proceedings.

Concerning the cases where inspections were made, excepting those of *Bristol*, *Wellington*, and *Woolwich*, I subjoin either the reports or extracts from the reports [A] which I received from the inspecting officers.\* To the cases of *Southampton*, *Epping*, and *Swansea*, I shall refer in later sections of this report. To the case of *Maidenhead* I need not further advert than to say that the mortality which had occurred in that town was, in my opinion, sufficiently accounted for by the facts of obstetrical practice which the inspector (Mr. Radcliffe) sets forth in his report. Except as regards these cases, the main interest of the papers which I append consists in their bearing on the question which was discussed in my last year's report—the very important question of the working of the Nuisances Removal Acts in England. The report on *Greenock* is of course not relevant to that question, but is valuable here for the more general purpose of showing to what monstrous degrees of overcrowding and filth, and to what consequent sufferings by disease, a population (even when its industrial circumstances are prosperous) may be brought by the unregulated use of tenement-houses. The remaining cases may be regarded as supplementary

\* At *Bristol* there was insufficient hospital accommodation for the poor with typhus, and the chief object of the inspection was to see to means for increasing the accommodation. At *Wellington* no question of much practical interest was raised. Regarding *Woolwich*, further inquiry did not add anything important to the information given in my last annual report.—J.S.

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illustrations of the argument of my last year's report on the inefficiency of our Nuisances Removal law:—*Aston Clinton*, with the pestiferous crowding of its children in plaiting schools,—*Great Ormesby*, with its structural nuisances,—*Waltham Abbey*, with its sewage-ditch continuing, in spite of remonstrances, under jurisdiction of a local board of health,—*Hadlow*, with its cesspools and stinking drains,—*Harting* (in the often complained of Midhurst Union) with its drinking-water almost ostentatiously polluted by excrement, and filth piled up as though it were treasure,—*Harwich*, with no useful memory of its former sufferings by cholera, but still cesspooled to the worst degree, and still with the worst of water-supplies,—*Chichester*, an episcopal city, a municipal and parliamentary borough, where still the inhabitants drink from beside their cesspools, and endure once a fortnight the almost unique nuisance of a very large cattle market in their streets,—and *Leeds*, with such an administration of the Nuisances Removal Act as, in proportion to the importance of the town, may perhaps be deemed the worst which has come to the knowledge of this department.\*

In order to do full justice to these cases in their illustrative relation to the efficiency of the Nuisances Removal Acts, it is requisite to remember that the year 1865, with its incessant alarms and public and private manifestos as to the approach of epidemic disease, was eminently a year when it might have been expected that the authorities would not be sleeping at their posts. Yet, adverting also to the evidence which was given on these matters in my last annual report, I cannot doubt but that the few above-mentioned instances represent innumerable others, now existing far and wide throughout the country.

As regards the correspondence which my Lords had during the year, on questions generally of the same nature as the above, I need only observe that the complaints which were addressed to their Lordships tallied with and corroborated the

\* I am glad to state, as the sequel of the communications which my Lords have addressed to the town council of Leeds on the sanitary state of the town, that for some time past considerable exertions have been making there to amend the state of things described in Dr. Hunter's report.—J.S.

opinion which I have expressed as to the frequent inoperativeness of our present sanitary laws, and that my Lords were unable to suggest remedies to persons who addressed them on this subject. Occasional  
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One case, however, deserves particular mention. From the respective vicars of Aylesford and Birling, two parishes in the *Malling Union*, my Lords in September last received complaints that the board of guardians refused to act in execution of the law, as authority for the removal of nuisances; the first complainant adding that a case of cholera (fatal after seven hours' illness) had just occurred in his parish; and the second, that, in a hamlet in his parish, always more or less marked by illness, where the people had open cesspools about their houses, and were drinking polluted water, fever was spreading fast from house to house. In answer to a letter which my Lords hereupon immediately (Sept. 14) ordered to be addressed to the board of guardians, inquiring on the subject, the clerk on the 27th September wrote that the guardians had directed a special meeting to be called for that day fortnight to take their Lordships' letter into consideration; and on the 11th October he wrote—"that at a special meeting held this day to take into consideration the Nuisances Removal Acts, it was moved that it was inexpedient to adopt those Acts, whereupon an amendment was proposed that they be adopted, and negatived by a majority of six to five." On receipt of this answer, my Lords directed a second letter to be written (Oct. 12) requesting to be informed of the precise meaning of this resolution, inasmuch as the Acts were general and did not require to be specially adopted, and asking particularly whether the guardians declined to receive complaints and to take proceedings under the Acts. To this second letter the guardians, on the 18th October replied, "that they considered the resolution passed at the meeting to be a sufficient expression of their meaning, which was, that they did not consider the 5th section of 23 and 24 Vict. c. 77. to be imperative, and they therefore declined to appoint a committee under that section." While this reply was still under their Lordships' consideration, one of the complainants wrote that, in some uncertainty whether their former applications to the

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board of guardians had been in all respects strictly in order, and in hope that the decision of the former meeting of the board might be reversed by another and larger meeting, they had decided to recommence their endeavours to move the board. Again, delay was interposed by a fortnight's adjournment of the board, and it was not till the 18th November that my Lords received the following information from the vicar of Birling: "The board of guardians has not thought " fit to make any reply to the memorial from this parish or " to my own letter (both dated 28th ultimo) but I am " informed by the elected guardian of this parish the matter " of the nuisances in Aylesford, Birling, and Snodland parishes " was pressed at the adjourned meeting on the 15th instant, " when the adoption of the Nuisances Acts was strongly " advocated by E. L. Betts, Esq., and others, but as strongly " opposed by the chairman, whose statements of the opera- " tion of the law at last secured a majority of one against the " adoption of the Acts." A letter to the same effect was received from the other complainant; and on the 21st my Lords received from the rector of Snodland, a third parish in the union, complaints that nuisances existed also there to an alarming extent, that typhus and diphtheria abounded, and that by the decision of the Malling board the inhabitants were left without any local authority to whom to apply. My Lords now brought the correspondence under the consideration of Secretary Sir George Grey; who referred it to the Attorney and Solicitor General for their opinion, whether, under the circumstances represented, proceedings should be instituted against the guardians of the Malling union, with a view to compel them to take such measures as were necessary for the protection of the public health. On the 28th December the answer of the law-officers was reported, to the effect that, in their opinion, there was not legal ground for the institution of proceedings against the guardians. The case requires no comment from me, but I beg leave to add the remarks with which the law-officers concluded the expression of their opinion:—"It is evident that the legislature has hitherto " thought it sufficient to rely mainly on the vigilance and " discretion of the local authorities, without providing against

" any perverseness or voluntary neglect on their part; and  
" the present case seems to show that in some districts, at all  
" events, further security is required for the public good."

#### FOREIGN EPIDEMICS OF THE YEAR, AND THE GENERAL QUESTION OF CONTAGION IN ITS BEARINGS ON THE PUBLIC HEALTH.

In relation to the spread of pestilential disorders, the year 1865 was of extraordinary and most painful interest. That Foreign Epidemics and Quarantine.  
in this year, after more than a century's interval, the herds of England were revisited by the most malignant of bovine plagues—the, to them, unfamiliar murrain of the Russian Steppes, would in itself be a sad distinction of the year. But the eventfulness of 1865 was even less in that field of suffering than in relation to human epidemics, and, in the latter respect, to persons who had to care for the public health, the last nine months of the year were a time of continuous anxiety. First, early in April, it was rumoured that a disease of the nature of *Plague*, coming from beyond the Ural Mountains, and causing depopulation in its course, had not only reached St. Petersburg, where it was said to be causing fearful ravages, but had spread beyond the Prussian frontier, and was prevailing, though in a less destructive form, at Dantzic and various other places in North Germany. Next, in June, came the importation of *Asiatic Cholera* into Egypt, and thereupon, radiating from Alexandria, for results which as yet have but begun, the renewed influence of this terrible infection in Europe. Thirdly, in September, there was the fact—hitherto, I believe, unparalleled in the epidemiological experience of this country, that an outbreak of *Yellow Fever*, fortunately not on a large scale, was occasioned to the population of Swansea by the arrival of an infected ship from Cuba.

It was but to a very limited extent that these important occurrences involved proceedings which technically were under the Public Health Act, 1858; and, strictly speaking,



Foreign Epi-  
demics and  
Quarantine.

proceedings under that Act are all that I am called upon to mention here. I may, however, so far exceed that limit as to include certain other proceedings which the same occurrences involved, and which were of general sanitary interest: proceedings of the Lords of the Council, which were either taken under the Quarantine Act, or at least had regard to its administration.

"Siberian  
Plague."

1. The first of the occurrences to which I have adverted, the rumour in April last that a "Siberian Plague" was advancing towards this country, was one which, except for the proverbial faculty of rumour to distort as well as magnify what it represents, might have justified the greatest alarm.\* And it was of course one which tended to raise a question of quarantine. Under the circumstances, my Lords thought it expedient that the facts should be investigated from this department, and, at their desire, I took the requisite steps for that purpose. Dr. Whitley was sent to St. Petersburg, and Dr. Sanderson to the country of the lower Vistula. The results of these investigations are contained in papers which I subjoin [A]; viz., a report which I addressed to the Lord President on the 19th April, and reports subsequently made by the two inspectors. Briefly, I may here state that the rumour which gave rise to the inquiry had joined together and disfigured two mutually independent truths; one, that our well-known typhus and relapsing fevers were epidemic in St. Petersburg;† the other, that

\* Terrible inflictions have before now come to us by that line of transit, and cholera is not the only pestilence which has thus come. Apparently it was through Russia, and perhaps as a "Siberian Plague," that, five centuries ago, the Black Death came to England. That, according to the best authorities, the Black Death, under the name of Pali Plague, still lives, and from time to time spreads, in the western and northern parts of India, and, when last told of, was even high in the Himalaya; that, if its infection passed the hills, little story would come to us of how it filtered through the sands of nomad and other savage life; but that presently it might be on the confines of Russia, and then again suddenly of the gravest European interest;—these are considerations which, in the minds of persons who know the facts of the case, would check all disposition to treat rumours of "Siberian Plague" with indifference. —J.S.

† It may be worth noting, that among the very various information which reached me from Russia about the time when the above proceedings were in progress, I found, as one element of confusion in the popular impression of the

cerebro-spinal meningitis—a peculiar nervous fever, hitherto scarcely known in England, was epidemic in parts of North Germany. "Siberian Plague."

It is only with respect to the latter disease that I need here make any further statement. From communications which have been made to me since the time when the inspectors reported, and particularly from information for which I am indebted to Dr. F. J. Brown, of Rochester, and to Dr. Clapton, one of my colleagues at St. Thomas's Hospital, I have reason to believe that for some time past the disease has been present in small amount in this country. I subjoin the substance of the communications with which Dr. Brown and Dr. Clapton have favoured me [A]. It is, in my opinion, unquestionable that some of the cases illustrate in sporadic form the same cerebro-spinal meningitis which in other countries has prevailed epidemically. And to this I may add two considerations. First, the morbid influence may perhaps to some extent show itself otherwise than in marked cases of idiopathic cerebro-spinal meningitis: experience of parallel circumstances suggesting as possible, that the mysterious "epidemic constitution" (as Sydenham would have called it) which favours the specific nervous fever in a given time and place, may also, to some extent, colour other diseases of the time and place with nervous, particularly tetanic or tetanoid, complications, and that an increased tendency to such complications may suffice to show the "epidemic constitution:" and both Dr. Brown and Dr. Clapton in their respective fields of observation are struck with evidence that of late this or something like it has been the fact. Secondly, it has to be remembered that till a disease is generally known to the medical profession, and is known by a distinctive name, solitary cases of it are easily confounded, either in fact or in name, with other more familiar diseases: that probably cerebro-spinal meningitis will thus to some extent be confounded with lock-jaw and

case, that a carbuncular disease of cattle, which was prevailing in parts of Russia, and which, according to a well-known property of such diseases, had in some cases led to infection of human beings, was being spoken of as "Siberian Plague."—J.S.

"Siberian  
Plague."

hydrocephalus, just as diphtheria ten years ago (when the present generation began to make their first practical acquaintance with it) was confounded, either in fact or in name, with various better known throat-affections and with scarlatina.

Asiatic  
Cholera again  
in Europe.

2. The choleraic infection of Egypt in May last, with the return of Mohammedan pilgrims from Mecca where the disease was epidemic; followed soon afterwards by the spread of the same infection, along each of the several lines of steamboat communication which diverge from Alexandria as a centre, to all the most considerable ports of the Levant and of Southern Europe; whence again in many instances inland spreadings of the disease took place;—this constituted a succession of events which augured badly for the public health in England. And presently, in the quarter where it was being looked for, a first wave of the infection had touched our shores, though happily not yet greatly to harm us. For the first time in our experience of cholera, the attack was on our south coast: not as on former occasions on our ports which look toward the Baltic: but on Southampton, distinguished among all our ports as the one of quickest Mediterranean traffic, and perhaps also (though this may have been secondarily) on Weymouth or Portland or Dorchester.

Of the epidemic progress which I have just summarily sketched, I do not attempt here to give the innumerable and somewhat intricate details, nor to compare the present course of the disease with steps of former visitations. On that subject, under their Lordships' orders, I requested Mr. Radcliffe, honorary secretary of the Epidemiological Society, to compile a special report; and, for the purpose, I put into his hands all the abundant information which the Foreign Office had communicated to their Lordships. The elaborate report with which he has recently furnished me, and which I append *in extenso*, gives all information which has hitherto been obtained as to the epidemic progress, compares the present with former invasions, and gives some interesting supplementary information as to the Mohammedan pilgrimages, in their relation to the present subject.

Of the very small share which England has yet had in the epidemic, the main facts are these. Into Southampton there came on July 10th, and at intervals afterwards, very suspicious arrivals from Alexandria, Malta, and Gibraltar. In the middle of August, a young woman in the town had a choleraic attack of doubtful nature; on the 22nd September a labourer had undoubted Asiatic cholera, of which afterwards he died; and from then, for about six weeks, cholera-cases continued to occur in small numbers in and about Southampton, so that on the 4th November (when the little epidemic might be considered at an end) there had been in all 60 such cases, of which 35 had terminated in death.

It is a question whether from Southampton, or in any more direct way, the morbid influence may in August or September have reached Weymouth or Portland or Dorchester: I have no proof that any such infection took place: but accidentally I am informed that a gentleman from a distance, who early in August was spending a week in Weymouth, and visiting both Portland and Dorchester, contracted during that week a diarrhoea which on his return home developed to severe cholera; and in September there occurred, in the neighbourhood of London, the following events which give peculiar interest to the question. Mr. G. and his wife, inhabitants of Theydon-Bois near Epping, had been lodging at Weymouth for seventeen days from the 8th September, had visited Portland on the 22nd, and Dorchester on the 23rd, and returned home on the 25th. On the evening of the 23rd Mr. G. had been seized with diarrhoea, sickness and cramps, which continued more or less through the next day, and left him still unwell on the morning of the 25th. He, however, performed his journey to Epping with his wife. She, during the journey, began also to complain of abdominal discomfort; and this, after her return, developed, with gradually increasing diarrhoea, to cholera, of which (in its secondary fever) she eventually died on the 11th October. On the 30th September (while the last-named patient was still in collapse) one of her daughters, aged eight, was seized with cholera, and in a few hours died. That same night, a serving-lad in the house was seized with cholera, and barely

Asiatic  
Cholera again  
in Europe.

escaped with his life. On the 2nd October, the doctor who was attending them died of cholera, after ten hours' illness. On the 3rd, another daughter of the house, aged 16, passed into cholera, but eventually, after some consecutive fever, recovered. On the 5th, a maid-servant got diarrhoea, which, though relieved for the time, relapsed and became choleraic on the 8th, and she, after some promise of recovery, fell into secondary fever, with which she eventually died. On the 5th also a labourer who worked on the premises, but lived apart, was taken with diarrhoea, which, passing on to cholera and collapse, killed him next day but one. On the 6th, the head of the house, the Mr. G. who had suffered at Weymouth, and had ever since had relaxed-bowels, got a very acute new attack, and died after 15 hours. On the same day his son was attacked with diarrhoea, and next day was in collapse, but rallied, and finally got well. Also on the 6th, the grandmother of the house was similarly attacked; and she, though she emerged from collapse, eventually died on the 14th. On the 10th a woman, living near by, whose only known connexion with the above cases was that on the 8th she had assisted in laying out the dead body of the above-mentioned labourer, was taken with choleraic purging, which soon led to collapse, and next day to death. Thus, within a fortnight, in that one little circle, eleven persons had been attacked with cholera,—mother, father, grandmother, two daughters, son, doctor, serving-lad, servant-maid, labourer, and country-woman; and, of these eleven, only three survived—the son, a daughter, and the serving-lad. Later, in the country-woman's family, there was another fatal case. It cannot well be doubted but that the exciting cause of this succession of events was, in some way or other, the return of the parents from Weymouth—of the father with remains of choleraic diarrhoea still on him, of the mother with apparently the beginnings of the same complaint. But this is only part of the case, and the remainder teaches an impressive lesson. All drinking-water of the house came from a well beneath the floor of the scullery; and into that well there was habitual soakage from the water-closet. Whether, in intimate

pathology, there are any essential differences between the Asiatic cholera which kills on a large scale, and the cholera which kills single victims, is hitherto so entirely unknown, that it would be idle to discuss, as a separate question, whether the G. illness, contracted at Weymouth and carried to Epping, was "epidemic" or "sporadic," "Asiatic" or "English," cholera; and, as above stated, I cannot prove it to have been an offshoot of the Southampton epidemic, or otherwise of Mediterranean origin. Certain, therefore, only is this:—that, from the time when Mr. and Mrs. G. returned ailing to their home, the discharges which passed from their bowels gave an additional and peculiar taint to the already foul water-supply of their household, and that thenceforth every one who drank water in the house drank water which had in it the ferment of decomposing diarrhoeal matters.

In relation to these, on the whole, inconsiderable manifestations of epidemic cholera in England, proceedings under directions of the Lords of the Council were taken as follows. With the assistance of Dr. Parkes, Professor of Military Hygiene at Netley Hospital, I watched the progress of the epidemic at Southampton, and addressed to the local authorities such suggestions as were necessary. And as soon as information came of the lamentable occurrence at Theydon-Bois (which unfortunately was not until all the above-described mischief had been accomplished) I instructed Mr. Radcliffe to investigate the facts, and to give such advice as might be useful. Professor Parkes made peculiarly exact inquiry into all the circumstances connected with the beginnings of the epidemic in Southampton, and into the relations of the cases to one another; and I append his report in extenso, not only for the positive information which it contains, but also as an useful illustration of the extreme difficulty which in all such matters there is in proving or disproving contagional relations. From Mr. Radcliffe's report I append[A] the section which describes in detail the circumstances of the infected water-supply.

And here terminates, for the year 1865, the history of cholera in England. What may be the facts of 1866, or what eventually will have been the share of England in the present



pandemic diffusion of the disease, are questions on which no materials for exact judgment exist, and where at any rate hope may be preferred to prediction.

Yellow fever  
at Swansea.

3. The outbreak of Yellow Fever at Swansea in September last was in one respect an event of extreme importance. That England is not insusceptible of this tropical infection, but that (at least under favouring circumstances) yellow fever can seriously damage a port-side population in England: this truth was conclusively discovered in Swansea at the cost of fully fifteen lives. Doubtless the atmospheric conditions under which the proof was given were conditions not habitual to our climate. Especially the heat was almost tropical. But no one can predict of any given year that its summer shall not reproduce the conditions which characterized the summer of 1865; nor can any one say that, if yellow fever infection should again begin to operate on our population, the mischief may not infinitely exceed those limits within which on the recent occasion it was confined. And accordingly, for the purposes of hygienic police, the outbreak to which I refer must be deemed to have given a most impressive warning.

The broad facts of the case may be told in very few words under the following two heads. First, the *Hecla* left Cuba on the 26th July with cases of yellow fever on board, had successive new cases till towards the end of August, entered Swansea harbour on the 9th September, with one of her seamen dying and two others but convalescent from the fever, and was immediately moored alongside a wharf; where she landed her sick, discharged (though not uninterruptedly) her cargo, and remained stationary till the 28th; when remonstrances, which at last had become irresistible, led to her being removed from within the dock. Secondly, from September 15th, six days after her arrival, to October 4th, six days after her removal, Swansea witnessed the entirely new phenomenon of yellow fever attacking in succession some twenty inhabitants of the town, besides others who suffered less definitely, or more mildly: and this not indiscriminately over the whole large area of Swansea, but only in definite

local relations to the ship: while at Llanelly there also fell sick in the same way three of the crew of a small vessel which had been lying for two days alongside the *Hecla* at Swansea. Yellow fever  
at Swansea.

While this mischief was in progress notice of it came to the Lords of the Council. On the 14th September, I received from the Registrar General information which the Swansea registrar had written him to the following effect;—that he had just registered the death of a man, aged 38, as caused by “exhaustion from fever, probably yellow fever;” that “this man was landed from a yellow fever infected ship, and died within three hours of being landed, in one of the dirtiest courts of Swansea, his death probably hastened by such removal;” and that “the case had created much excitement in the town, as several deaths occurred on board the ship after leaving Cuba, and several of the crew were affected when the ship was brought into port.” On the 26th, I received intelligence from the Registrar General that a death by yellow fever had occurred among the population of Swansea,—viz., that a man, of whom it was stated that he had gone on board the infected vessel soon after her arrival, had died of yellow fever after five days’ illness, and that other attacks of yellow fever were reported. Hereupon, under their Lordships’ orders, and with the assistance of Dr. Buchanan, as inspector, I immediately took measures to investigate the details of the case, and to advise the local authorities on their management of the danger which had arisen. The very interesting report which Dr. Buchanan made to me at the end of the outbreak is appended in extenso [A]. And I may refer to that report for all details, both as to the ætiological connexion of facts in the case, and also as to the circumstances under which the intentions of the Quarantine Act had been frustrated.

I have said that the outbreak which I have described was, so far as I know, unparalleled in the experience of England. Indeed, anywhere on this side of the Atlantic, yellow fever is a rare phenomenon; and, on the few occasions when it has been epidemic in Europe, even the northmost latitude where it has been seen has been south, and almost invariably much

Yellow fever in  
1861 at  
St. Nazaire.

south, of the southmost latitude of England. Five years ago, however, France was startled, as now England has been, by an outbreak of yellow fever in a latitude where the disease had never before been epidemic—namely, at St. Nazaire, at the mouth of the Loire.\* The Lords of the Council, as administrators of the Quarantine Act, had the facts of that occurrence brought before them—facts, in many respects, similar to those of our own outbreak, though the results were more complicated and more injurious. And I propose here to recount these facts; presuming that the liabilities of England in the matter of yellow fever may for practical purposes be deemed identical with the liabilities of St. Nazaire; and contending, therefore, that our Swansea lesson may be made additionally suggestive when studied in the light of that second instance. The story, as I got it from the official communications, was briefly this:—That about June 13 the *Anne Marie*, a wooden sailing vessel loaded with cases of sugar, left Havannah, where yellow fever was epidemic;—that between July 2 and July 12 attacks of yellow fever occurred on board;—that on July 25 she arrived at St. Nazaire, where, “twenty days having elapsed since the last death, and “thirteen days since the last case [attack] of illness,” she was admitted to free pratique;—that till the 3rd of August she was being unloaded by labourers of St. Nazaire;—that many of these labourers were, on the 5th and 6th of August, attacked with yellow fever;—that previously (on the 2nd, 3rd, and 4th of August respectively) the mate of the *Anne Marie* who had remained on board, a cooper who had been “employed to repair the cases,” and a stone-cutter “who had “been working on the quay near to the *Anne Marie*,” had been attacked with illness which, in at least the first two, was believed to be yellow fever;—that, moreover, on August 1, the *Chastan* (which now was at Indret, but previously had been at St. Nazaire lying alongside the *Anne Marie*) had had

\* The latitude of St. Nazaire is about  $47^{\circ} 17' N.$ , which is some  $4\frac{1}{2}$  degrees south of Swansea. The northmost place, where it had ever before been epidemic, in France is, I believe, Rochefort, about  $46^{\circ} N.$  Portsmouth in the state of New Hampshire of the United States represents, I believe, the northmost latitude at which it has ever been epidemic on the other side of the Atlantic; the latitude, namely,  $43^{\circ} 4' N.$ —J.S.

a first attack of yellow fever, and that by August 5, all the five men who formed her crew had been attacked;—that when the place of the *Chastan* beside the *Anne Marie* was taken by the *Dardanelles*, a boy in charge of the *Dardanelles* (the only person on board her) contracted yellow fever;—that the *Cormoran*, which had been taking cargo from the *Chastan* while alongside the *Anne Marie*, had, after some days, two cases of yellow fever on board;—that a steamer of the Lorient Company, having remained two days in harbour near the *Anne Marie*, had, on returning to Lorient, two of her crew attacked with yellow fever; that two lighters from Indret, having also remained two days near the *Anne Marie*, had afterwards their crews, seven or eight in number, attacked with “a kind of half-yellow fever;”—finally, that an eighth vessel, the *Arequipa*, which had also remained for several days near the *Anne Marie*, and had on August 1 sailed for Cayenne, but been detained off the French coast by bad weather till August 5, had on August 5 a first attack of yellow fever, and had other attacks at intervals during the six or seven weeks following. It was alleged, moreover, that while the above events were in progress, certain of the patients, being on shore at St. Nazaire and its neighbourhood, communicated yellow fever to two or three, and slighter illness of the same kind to some others, of the persons who were about them; but, without going here into any minute discussion of these cases, I may state, as the conclusion to which a careful study of the official papers led me, that, in my opinion, it was only in a very qualified sense, if at all, that communication of yellow fever by means of personal intercourse could be said to be proven by the cases.\* The

Yellow fever in  
1861 at  
St. Nazaire.

\* “In one very important case (that of M. Chaillon) the sufferer is said not “to have been near the ship, but to have contracted the infection from certain “labourers who came infected from the ship, and whom he attended medically “[‘frictioned’] at their homes. In a second case, one of the ship labourers, “who himself had yellow fever, is said to have carried the infection certainly to “his wife, and perhaps to an old man in whose house he and his wife lodged; “for these two had attacks of yellow fever, the old man fatally; and though it “was ‘not known as a certainty’ by M. Mélier that the old man had not been “near the ship, it seems agreed that the woman had not been there. [H.M. “Consul, Sir A. Perrier, eventually found reason to believe that both these “persons had been exposed to chances of direct infection from the ship.] In

Yellow fever in  
1861 at  
St. Nazaire.

total mischief done by the outbreak was set down at 44 cases of yellow fever, resulting in 26 deaths from the disease. It was stated that, at the time when the *Anne Marie* arrived in port, there was no other vestige of yellow fever at St. Nazaire, or in its neighbourhood; that neither yellow fever nor anything like it had ever before existed in the district; and that no other yellow fever was seen in that summer on this side of the Atlantic. The description given of St. Nazaire was this:—"the town is partly built on the strand, and is tolerably healthy; its vicinity is marshy, and subject to intermittent fevers—perhaps more than usually so this year: nevertheless, nothing uncommon was observed

" some other cases, persons who apparently had not been near any affected ship, but had attended patients from the *Chastan*, were attacked, though but slightly, with symptoms very suggestive of yellow fever. M. Mélier's belief with regard to the several just-cited cases is, that they were cases of true contagion, using the word 'contagion' in the sense in which we call smallpox and typhus contagious. Without pretending to controvert this belief (which on other grounds may or may not be tenable), I would observe that it is not a necessary consequence of the facts recorded in the present papers. The facts, supposing no exception taken to them, would be to this effect:—that labourers who had spent time in the hold of the *Anne Marie*, and had caught yellow fever there, carried with them some power of infection; and that a like power, much feebler in degree, went also with the crew of the *Chastan*. But almost unquestionably, with regard to the *Anne Marie*, and not improbably with regard to the *Chastan*, it seems that the ship, irrespectively of sick persons in it, was a focus of yellow fever infection. And, on this showing, the alleged facts admit of more than one interpretation. Whether, namely, the men carried infection because they themselves had contracted yellow fever, or merely carried infection passively as they might have carried an odour from the ship; whether men who had laboured in the hold of the *Anne Marie* without themselves contracting yellow fever there might equally have carried infection to their homes; whether they who carried infection might have been disinfected by soap and water and change of dress; whether, in short, the infective power belonged, not to the sick body, as such, and to its excretions and discharges, but to the mere washable surface and clothing which had been saturated with the atmosphere of the ship; this question remains unanswered by facts in the present record. And I draw attention to that openness of the question, because of its all-important bearing on the practical issue, whether it was necessary to adopt at St. Nazaire the system of personal quarantine which certain of M. Mélier's regulations enforced."—Extract from Office-Memorandum on the St. Nazaire outbreak. See also Appendix, 8th Report. The distinctions which I have drawn as to the mode in which yellow fever might have been (if it was) communicated by personal intercourse at St. Nazaire, and the doubts which I have intimated as to the provenness of true contagion there, are equally applicable to the discussion of the somewhat similar facts which are reported to have occurred thirteen or fourteen years ago at Southampton.—J.S.

" in the state of public health." The weather is said to have been extremely hot—"more like that of a tropical than of an European climate."

Before closing my account of these two little outbreaks of yellow fever in exceptionally northern latitudes, I ought to state that, though nothing of quite the same sort had previously occurred either in England or in France, yet, in both countries, some slight and almost overlooked warnings, to the same general effect, had been given. Thus, in France, though apparently yellow fever had never touched the ordinary land-population, or spread from ship to ship anywhere so far north as St. Nazaire, probably, on a few occasions, and in very small amount, the disease had been seen in the quarantine establishment of a still more northerly port—that of Brest, attacking now and then some official whose business had been with a newly-arrived infected ship.\* Dr. Buchanan's inquiry at Swansea elicited that probably on two or three occasions a solitary case of yellow fever had occurred there under like circumstances. At Southampton too, on one occasion, in 1852, it happened that an engineer of an infected ship was attacked with yellow fever on shore eight days after the ship's arrival in port.† And it is alleged that also at Southampton, in the years 1852–3, the landing of yellow fever patients from infected ships led on three occasions to ill-results, as follows:—that in one case, witnessed by Mr. Wiblin in December 1852, it was believed that a convalescent from yellow fever infected two members of his family, who afterwards infected three others, with illness much less severe than ordinary yellow fever, but having at least some affinity to it; that, in another case, witnessed by Mr. Dusautoy, in the summer of 1853, a woman died with symptoms of yellow fever shortly after having washed the clothes of a seaman who had been

Yellow fever  
in Northern  
Latitudes.

\* Particulars of one such occurrence (which took place in 1856) are given in the Bulletin de l'Académie de Médecine, vol. xxii.—J.S.

† See the case, as reported by Mr. Wiblin, in the Lancet of 1853. I may note here that the ship was a wooden one, and that the engineer, though lodging on shore, had been spending much of his time in the ship. Also I may note that, in our present ignorance as to the incubation-time of yellow fever, we cannot absolutely say that the disease was not latent in the man when he first landed.—J.S.



landed with that disease; that, in the remaining case, witnessed by Mr. Wiblin in July 1853, it was believed that a yellow fever patient taken to the Southampton poor-house communicated his disease, in a fatal form, to another inmate of the establishment. It is proper to add that, in some of the above cases, medical controversy was raised as to the nature of the disease. Of course no absolute judgment can now be given on questions of fact which so many years ago were in dispute; but, so far as the statements are accepted in proof of the communicability of yellow fever by personal intercourse, the acceptance must be qualified with the same considerations as I have expressed in regard of the corresponding statements at St. Nazaire. In the thirteen years which have elapsed since the occurrences in question, persons, more or less ill with yellow fever, have on numerous occasions been landed at Southampton from West Indian steamers; but in no case, so far as my information extends, has it even been suspected that their disease has spread to other persons. Nor did anything of this kind arise in connexion with the above-mentioned case of the engineer who ran the whole course of his disease in Southampton.

The various incidents to which the last preceding pages have been given possess in common one particular kind of interest. For when the public mind is troubled with facts or rumours of epidemic visitation, question always arises how far the mischief can be stopped or prevented by restrictions on the ordinary freedom of traffic, national or international. And since the present report records the coincidence of several cases wherein that question was raised, it may be convenient that I here briefly state the principles on which such cases have been considered.

Contagion in  
its bearings on  
the Public  
Health.

When phenomena of pestilence are under popular discussion, and most of all when quarantine is being spoken of, frequently language is used which seems to imply a belief that the medical profession is divided as it were into two camps, respectively of "contagionists" and "anti-contagionists." Now, so far as my knowledge extends, I will

venture to say (speaking of course of the medical profession as represented by its acknowledged teachers) that no such duality of opinion exists. That many of our worst diseases acquire diffusion and local perpetuity by means of specific infective influences which the sick exercise on the healthy, is an elementary truth of medicine; and among persons who are competent to distinguish the certainties from the uncertainties of science, there is no more doubt, broadly, as to that truth than there is doubt as to the diurnal and annual movements of the earth.\* Ambiguities which fifty years ago existed in respect of some particular cases have since then been gradually cleared away;—sometimes through the ascertainment that seeming contradictions of fact were facts of different diseases confounded under a common name;† sometimes through the new and conclusive evidence of well recorded cases and experiments;‡ sometimes through improved insight into the habits of a morbid poison;§ and generally through that better grasp which time has given us of the subject as a whole. And more and more the once chaotic phenomenology of contagion is tending to become an intelligible and consistent section in the great science of organic chemistry.

On the other hand, not even the merest tiro in medicine supposes that contagion (as a morbid power acting from each sick centre) operates equally on all persons, or equally under all varying circumstances of place and time. Differences are

\* In my sixth annual report, when discussing the subject of the spread of communicable diseases in hospitals, I stated with some detail, and need not now again state, the very different conditions under which different diseases are communicated. Vol. II., pp. 150, *et seq.*—J.S.

† Well, for instance, might there be difference of opinion about the communicability of "continued fever," while under that name typhus, typhoid, and relapsing fevers were all spoken of as one disease. So, too, in regard of syphilis, the old uncertainty as to the laws of the contagion depended in great part on confusion between two kinds of chancre.—J.S.

‡ Such, for instance, as those by which the contagiousness of typhoid fever and of cholera has been established.—J.S.

§ As, for instance, in the knowledge which has been got as to the great development of contagious property in choleraic discharges some two or three days after their discharge from the body; or the knowledge of the different effect which one kind of syphilitic inoculation exercises on those who have, and those who have not, previously suffered from a like inoculation.—J.S.

Contagion in  
its bearings on  
the Public  
Health.

Contagion in  
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Health.

obvious even to superficial observation, and such differences become still better appreciated as the general doctrine of contagion gets to be better understood.

First, as regards personal differences of susceptibility;—they are seen, on a small scale, when we observe with what different degrees of severity different persons and different families, in similar external circumstances, and with similar exposures to contagion, suffer the diseases which they thus contract; and, on a much larger scale, the same thing is seen in that permanent and complete insusceptibility which most persons acquire in relation to certain contagia which have once affected them: to small-pox, typhus, and measles, for instance: so that millions of persons who have acquired that kind of immunity are being daily exposed to chances of contagion, but, whatever the quantity of the contagium, and whatever the external circumstances, do not suffer second attacks of the disease which they have once undergone.

Secondly, as the local circumstances vary in which a contagiously-diseased person is placed, so, *pari passu*, the power of contagion may show an almost infinite range of differences. Typhus and typhoid fevers, for instance, which, amid overcrowding and non-ventilation and refuse-odours and foul water-supply, would develop themselves to be the most spreading of pestilences, will, in thoroughly clean atmospheres and with thoroughly clean water-supply, be so restricted in their infectiveness, that typhoid will scarcely be recognized as contagious, nor even typhus extend beyond limits which admit of being narrowly defined. Again there are certain geological conditions which make the greatest difference (though probably only in an indirect way) to the spread of the diarrhoeal infections.\* And, even apart from such influences as the above, it seems doubtful whether all contagious

\* This, in relation to cholera, has been more or less definitely observed throughout all the fifty years that the disease has been studied; first abundantly in India, and afterwards in Europe. See Hirsch's *Hist. Geogr. Pathologie*, Vol. I., pp. 134–146. In 1848–9, when I first had to do with the disease, though but in one city, the fact forced itself strongly on my attention. See reports on sanitary condition of city of London. The subject has much prominence given to it, and is admirably treated in Professor Pettenkofer's contributions to the report of the Royal Bavarian Commission on the cholera-epidemic of 1854.

diseases are equally capable of pandemic extension:—it is said, for instance, that hitherto neither scarlatina nor typhus has shown much disposition to spread either in Asia or in Africa.

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Thirdly, the very important qualification has to be stated, without which no one can bring into an intelligible whole the epidemiology of different lands and different ages of the world, that, in the category of time, far out of human reach, there are circumstances which greatly influence contagion. Any one who will reflect on that most curious branch of natural history which treats of the various plagues which in different times have fallen, sometimes on man, sometimes on his fellow-creatures of the animal or vegetable world, will be convinced that not fixed local conditions, and not mere more or less of international traffic can, either singly or conjointly, explain the wonderful fluctuations of effect. When the ordinary distribution of human disease on the surface of the globe is studied, it is easy to distinguish certain spaces, of larger or smaller area, within which certain well-marked forms of disease appear as though they were native to the soil: where the local pathology is almost as definite as the local flora: but while some such diseases remain, so far as we know, permanently limited to places where they are endemic, others of them have once or oftener spread widely from their respective centres, have tended to general diffusion on the earth, and have then again retired within their former limits. Again, there are diseases, to which we cannot assign any definite local birthplace, but which, sometimes of prominent interest, and sometimes almost or quite lost to observation, are present on the earth's surface at different times in vastly varying quantities. Now, subject to qualifications of detail, it seems generally unquestionable that the diseases which in one or other of those ways immensely vary from time to time in the quantity of their known existence upon

The bearing of the geological influence, however, is apparently none but this:—that where populations are living in certain geological conditions, there, unless engineering science have supplied artificial drainage and water-supply, the local atmosphere and drinking-water will almost certainly be much polluted by those faecal impurities amid which the diarrhoeal contagia are peculiarly apt to multiply.—J.S.

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earth, are diseases which human intercourse can spread; and doubtless there are cases where quantitative differences of intercourse can be deemed a sufficient explanation of the quantitative differences of disease. No one, for instance, can doubt but that the changed relations of the two halves of the world after the discovery of America were enough to account for the subsequent dreadful sufferings of America by small-pox, and rendered plausible the hypothesis that the old world got syphilis from the new. Nor—to take a minor and collateral illustration, needs any one go farther than to the changed circumstances of our cattle-traffic within the last few years, in order to explain why the phenomenon of steppe-murrain infection is now again seen in England after an absence of more than a century. But not all the cases in question admit of such facile explanation. Thus,—for what reason it is that Asiatic cholera, during the last half-century, has had certain definite fits of pandemic extension, and has three times been exceedingly fatal in Europe, where previously it had been unknown or was forgotten; or why diphtheria, which scarcely had had a place in history till it overran Europe in the 16th century, and which since then had but rarely been spoken of, has for the last ten years been an important disease in England; or why the plague of the Levant has within the last century or two become an almost obsolete disease; or why the yellow fever of the tropics has in particular years raged furiously in parts of Europe; or why our black death of the 14th century, now not extinct in India, has never but once been in Europe; or what has become of our sweating-sickness of three centuries ago;\* or whence has come the modern importance of

\* The English sweating-sickness was first seen in 1486, when, as a disease previously quite unknown, it started apparently from somewhere in Wales. A second epidemic of it came in 1508; a third in 1518, when it spread from England to the French coast; a fourth and most severe in 1529, when it spread from England over great part of the continent of Europe; and a fifth in 1551. The disease then entirely vanished. A century afterwards a new disease (which has been known down to our times, chiefly in France, as miliary fever, or *la suette*) somewhat resembling the old English disease, but also with definite differences from it, sprang up as suddenly at Leipzig as Ovid's famous Nereid in Ortygia. And that disease, familiarly as it is known in France, is, I believe, unknown in England.—J.S.

cerebro-spinal meningitis;—these are questions which, even separately, but most of all when considered in their mutual connexion, are seen to admit of no explanation from a merely biological basis. The student must enlarge his view to regard the chemistry of the surface of our globe as subject to variations, perhaps definitely progressive or cyclical, in which human epidemics are but a part. If popular pathology, working on its few local facts, sees something of this in the “unhealthy seasons” which arise in exceptional circumstances of rain-fall and temperature: if some such “atmospheric” influence must be invoked to explain, even for a single climate, the fluctuating fatality of the most ordinary of zymotic diseases:\* if, as recent researches render probable, the variations of typhoid fever in a single town cannot be

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\* TABLE showing the Number of Deaths in England from each of certain Zymotic Diseases in each of the 23 years for which the record has been made.

Years.	Scarlatina.	Diphtheria.	Measles.	Whooping Cough.	Smallpox.	Fever.	Diarrhœa, Dysentery, and Cholera.
1828	5,802	—	6,514	9,107	16,268	18,775	3,440
1829	10,325	—	10,937	8,165	9,131	15,666	3,493
1830	19,816	—	9,326	6,132	10,434	17,177	4,799
1841	14,161	—	6,894	8,099	6,368	14,846	4,198
1842	12,807	—	8,742	8,091	2,715	16,201	7,622
1847	11,697	—	8,690	9,260	4,227	30,994	15,630
1848	20,502	—	6,867	6,862	6,903	22,037	15,604
1849	13,111	—	5,464	9,615	4,645	18,347	74,155
1850	13,370	—	7,080	7,770	4,666	15,375	14,400
1851	13,594	40	9,370	7,905	6,997	17,930	18,045
1852	18,813	74	5,816	8,022	7,320	18,641	21,754
1853	15,653	46	4,895	11,200	3,151	18,554	20,502
1854	18,325	263	9,277	9,770	2,808	18,893	42,092
1855	17,128	186	7,354	10,185	2,525	16,470	15,044
1856	13,931	229	7,124	9,225	2,277	16,182	15,912
1857	13,919	310	5,969	10,138	3,936	19,016	24,037
1858	25,481	4,836	9,271	11,648	6,469	17,883	16,004
1859	9,907	9,587	9,518	8,976	3,818	15,877	20,597
1860	9,681	5,212	9,557	8,555	2,749	13,012	11,185
1861	9,077	4,517	9,055	12,309	1,320	15,440	20,999
1862	14,834	4,903	9,800	12,272	1,628	18,721	12,667
1863	30,475	6,507	11,349	11,275	5,964	18,017	16,801
1864	29,700	5,464	8,323	8,570	7,684	20,106	18,366



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understood without reference to the varying water-level in the local soil, and to the physical and chemical consequences of its alternate rises and falls.\* much more is the truth to be appreciated when the field of consideration widens to the epidemiology of the world, and especially when the great pestilences are regarded which have made epochs in human history. Those almost explosive arisings or spreadings of disease are facts of cosmo-chemical disturbance which no mere contagionism can explain. The powers by which such disturbances may be made, the nearer and remoter influences which may vary chemical transformation upon the earth, are hitherto, perhaps, rather guessed at than known; but it seems probable that the so-called caprices of epidemics will never be adequately explained till the interpreter has for his context a true knowledge of those cosmical influences, and of the "caprices" to which they too are subject.

I have dwelt on the above qualifications in order that I may not be misunderstood in the remarks which I am about to make, doubtless in the contagionistic point of view, on the foreign diseases which came under consideration in 1865. Of these, for my present purpose, cholera is infinitely the most important. Cerebro-spinal meningitis, if diffusible by human intercourse, is not so in a high degree. Yellow fever (apart from other considerations concerning it to which I shall hereafter advert) may at present be assumed to have

\* I refer particularly to a paper by Professor Buhl, in the first volume of the *Zeitschr. der Biologie*, and to a corroborative paper by Dr. Seidel in a later part of the same volume, on the relations of typhoid fever in Munich to the fluctuations of water-level in the wells of the city. These papers, however, only represent, with regard to typhoid fever, the continuation of a line of study which had been opened with regard to cholera by Professor Pettenkofer of Munich; whose many valuable contributions to the science of cholera deserve the most grateful acknowledgments from all who are interested in the subject. According to this author, the best soil for cholera is a porous soil, easily penetrable by air and water, and in which water is to be found not far below the surface, and which is foul with excremental matters; and the times when such a soil is aptest to multiply cholera-contagium are times when the water-level in it is falling after having reached an unusual height. The degree in which a given cholera-contagium, when imported, produces epidemic results is, according to Professor Pettenkofer, essentially determined by the degree in which its importation coincides with the fulfilment of those two conditions of place and time.—J.S.

little or no tendency to spread in this country. But with cholera the case is different. Not disregarding the qualifications which I began by setting forth: not asserting that the mere uniform influence of contagion would account for the several fitful spreadings of cholera from the East; not ignoring that the power of the cholera-contagium in our climate varies almost infinitely according to local circumstances, and specially according to those circumstances which regulate the distribution of typhoid fever: I yet, for public health purposes, deem it quite essential to insist on the evidence which is now accumulated in all the archives of European Medicine, attesting the contagiousness of cholera.

The doctrine on this subject which in my opinion deserves, in the present state of knowledge, to be accepted as practically certain—sufficiently certain, I mean, to be made the basis for precautionary measures, may be stated in the following propositions:—that, when cholera is epidemic in any place, persons who are suffering from the epidemic influence, though perhaps with only the slightest degree of diarrhoea, may, if they migrate, be the means of conveying to other places an infection of indefinite severity; that the quality of infectiveness belongs particularly, if not exclusively, to the matters which the patient discharges, by purging and omitting, from his intestinal canal; that these matters are comparatively non-infective at the moment when they are discharged, but subsequently, while undergoing decomposition, acquire their maximum of infective power; that choleraic discharges, if cast away without previous disinfection, impart their own infective quality to the excremental matters with which they mingle, in drains or cesspools or wherever else they flow or soak, and to the effluvia which those matters evolve; that if the cholera-contagium, by leakage or soakage from drains, or cesspools, or otherwise, gets access, even in small quantity, to wells or other sources of drinking-water, it infects in the most dangerous manner very large volumes of the fluid; that in the above-described ways even a single patient with slight choleraic diarrhoea may exert a powerful infective influence on masses of population among whom perhaps his presence is unsuspected; that things, such as

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bedding and clothing, which have been imbued with choleraic discharges, and not afterwards fully disinfected, may long retain their infectious properties, and be the means of exciting choleraic outbreaks wherever they are sent for washing or other purposes.

Precautions  
against Con-  
tagion.

The precautions, generally, which may be taken against contagious diseases are of two kinds:—first, if possible, to prevent the entrance of the contagion;—secondly, if the contagion be present, to annihilate as far as possible the circumstances which favour its spread.\* And thus, as regards cholera, a first and incalculably important question to be answered by those who have to care for the public health of a country, is the question whether, by any measures of quarantine, they can provide that all contagion of the disease shall be kept outside the limits of their land.

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Subject to one qualification, which is not an important one for the present argument, it may, I think, be accepted as certain that quarantine, conducted with extreme rigour, and with the precision of a chemical experiment, will keep cholera out of any part of Europe in which the extremely difficult conditions can be absolutely fulfilled;† and thus, if I speak

\* To the above-mentioned two kinds of precautions may be added, with regard to many important cases, a third, as follows:—So far as practicable, not to bring into personal relation with the sick, as attendants or otherwise, any persons who have not before acquired, or probably acquired, an insusceptibility to the existing disease. In typhus-epidemics, for instance, economies of valuable life may often be made by preferring for employment as nurses, doctors, inspectors, and so forth, persons who have already once had typhus. The same principle applies to many other contagious fevers; but I have no evidence that it in any degree applies to cholera. If I mention yellow fever in this note, it is not with any intention of classing it as a contagious fever in the sense in which typhus is contagious; but, as the same principle of conduct is involved in both cases, this may be a convenient place for observing, that when yellow fever is epidemic in districts, persons to be sent into those districts ought, as far as possible, to be only persons who have already had that disease.—J.S.

† The qualification with which the above opinion is guarded relates to the uncertainty how far the mysterious influence which starts, and perhaps accompanies, each pandemic extension of cholera, is an influence which creates new centres of "spontaneous generation" for the disease. As regards Europe, there seem to be strong presumptions against the likelihood that any such new centres are created. But this negative cannot be deemed absolutely certain; and of course the qualification becomes more and more important, in proportion as the country to which the question applies is near to those countries where cholera first had its beginning.—J.S.

to the dry question of medical practice, I have no hesitation in saying that England ought to resist cholera by quarantine. On the other hand, though I cannot pretend to discuss with any kind of authority the non-medical aspects of the question, it would be mere pedantry for me to ignore that facts which are of common notoriety, and considerations which are of common sense, conflict with that medical conclusion. A quarantine which is ineffective is a mere irrational derangement of commerce; and a quarantine, of the kind which ensures success, is more easily imagined than realised. Only in proportion as a community lives apart from the great highways and emporia of commerce, or is ready and able to treat its commerce as a subordinate political interest, only in such proportion can quarantine be made effectual for protecting it. In proportion as these circumstances are reversed, it becomes impossible to reduce to practice the paper plausibilities of quarantine. The conditions which have to be fulfilled are conditions of national seclusion; and the fulfilment of such conditions by England would involve fundamental changes in the most established habits of the country.

In order to illustrate this view, the medical postulates of quarantine deserve to be considered in detail. Quarantine, purporting to be effectual, cannot rest satisfied with excluding from entry such persons as are obviously sick, but, indispensably for its purpose, must also refuse to admit the healthy, till they shall have passed in perfectly non-infectious circumstances, at least as many days of probation as the disease can have days of incubation or latency;—this condition often involving as its consequence that, if one case of disease arise among a number of persons in quarantine, the whole number of apparently healthy must recommence their period of probation, and this perhaps again and again. Now, setting aside, as not essential to quarantine, the cruelties which its mal-administration involves, and which in practice are almost identified with its exercise: criticising only the conditions which quarantine, if it is to be effective, must involve: and, for the moment, not even counting as an objection the cost of that gigantic establishment which has to be permanently



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maintained in order to meet occasional exigencies: I here insist only upon the restrictions.\* Considering what they, when really carried into effect, must involve—what inconvenience to persons, what interruption to commerce, and on how vast a scale, and for what indefinite duration of time, no one can expect, in regard of great trading communities, that governments, if they go so far as to enact, will have much success in enforcing, quarantine. Against the efficiency of it, when enacted, there operate some of the strongest of all law-breaking influences; on the one hand, instincts of contempt for the narrow self-protectiveness which it represents, and, on the other, those eager commercial interests which now mainly govern the world. The latter, in proportion as they are affected, elude the restrictions which would embarrass them. Contraband of quarantine, like ordinary smuggling, is developed as soon as the inducements for it are considerable. And thus, practically speaking, where great commercial countries are concerned, it can scarcely be dreamt that quarantine-restrictions will be anything better than elaborate illustrations of leakiness.

In respect of England, moreover, there are other facts to be stated. In 1832-3, when some sort of quarantine against

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\* It may be convenient to consider the restrictions in some detail, and with cholera to illustrate their bearing. The incubation-time of cholera, in the strict medical sense of the words—i.e. the time which elapses between the moment of infection and the moment when critical inquiry may first discover an altered (though perhaps but very slightly altered) action of the bowels, may be not more than two or three days; but practically the incubation-time of the disease must be regarded as of much longer duration—as continuing, namely, till the symptoms are so far developed that the sufferer cannot overlook or disguise them; and this point in the progress of the disease may not be reached till the first slight looseness of bowels (which many persons would overlook or deny) has continued for many days, or, it is said, even for weeks. If for the purposes of the argument we assume that an allowance of ten days will cover the time during which infection can be latent or designedly concealed: which, however, is less than the time on which quarantining governments insist, and, I believe, only half the time of an average quarantine in Greece: and if we translate into practical language what this would mean, if England had quarantine against the continent: it would be, that ten days would be the minimum time in which any person, sick or healthy, could enter England from the continent—that, for instance, our present ninety minutes between Calais pier and the Dover railway-station would become an affair of at least ten days, and that no national advantage from quarantine could be promised, if this rule were in any single case relaxed or evaded.—J.S.

cholera was adopted here, the results gave no encouragement Quarantine. to a repetition. Then followed the erroneous belief (which subsequent better knowledge has corrected) that the spread of cholera is unaffected by human intercourse. Under these and other influences the thought of quarantine in England became more and more obsolete, and the possibility of enforcing it, if ever so much desired, fell more and more towards nothingness. Probably there was the practical conviction that, against any contagious disease current on the continent of Europe, quarantine, of the utmost strictness which England could hope to attain, would not give results worth the sacrifice. I daresay that quarantine in England was never otherwise than very lax. And at all events for many years past it has, in every medical sense, been abolished. Also with its virtual extinction, the establishment for giving it effect has declined. As successive governments advanced further and further in relinquishing what probably at its best was only a sham of quarantine, corresponding reductions of establishment were made. And the result of the entire process may be told in these very few words,—that, at the present moment England has not in readiness the means of properly quarantining even a single ship.\* It is not for me to say that this state of things may be deemed final. But if reversal of the policy which it expresses were ever so much desired, it could not be effected off hand. Enormous first expenditure of money in creation of proper lazarets would be wanted, as well as subsequent very large annual outlays for maintaining the necessary establishments. And the time which would be required for bringing the organization into work forbids the supposition that this could ever be done on emergency.

So, for England, under present circumstances, quarantine against cholera, as existing in the countries which are nearest to us, is a precaution of which there can be no serious thought. Were the country ever so ready to endure these extreme

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\* It may be proper to mention that the ceremonies to which, under the name of quarantine, certain trans-atlantic ships are subjected, on their arrival in this country, have not, properly speaking, any medical significance in relation to this country, but are part of an international obligation contracted for commercial reasons.—J.S.



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restrictions without which the whole thing is fruitless and absurd, the means for imposing them do not exist\*. To extemporise a *cordon sanitaire* is simply and totally impossible; and no partial quarantine can be relied on for national purposes. Not only as regards cholera, but generally as regards all contagious disease, the position, which now has to be recognized and dealt with, is—that contagions current on the continent of Europe must be deemed virtually current in England.

Imperfect state  
of our sanitary  
law and ad-  
ministration.

Having regard, however, to our entire unprotectedness by quarantine against any contagions which may threaten us from abroad, I feel it additionally incumbent on me to insist on the present very imperfect state of our sanitary law and administration. Especially in view of the present re-infection of Europe by Asiatic cholera the necessity for a better state of things seems to me of the most urgent kind.

On the one hand I would beg leave again to refer to the evidence which is summed up in my last report, and is corroborated by new instances in the present one, as to the very extensive inoperativeness of the Nuisances Removal Acts in England.

And on the other hand I would refer to the observations which conclude my letter [A] addressed to the Lord President in April last, on the powerlessness of local authorities in regard of certain dangers of contagion. The footing on which the country now stands in relation to foreign

\* When cholera last year broke out so vehemently at Alexandria, and was hitherto not in Europe, it would have been, comparatively speaking, a trifle to quarantine arrivals from that one port; not only because of their being few, in comparison with the innumerable arrivals from the ports of continental Europe, but also because, with the long voyage, the object of quarantine would generally have accomplished itself before arrival. And medically, of course, such a precaution was to be desired. But while my Lords still had it under consideration, whether to establish this amount of quarantine, and to provide the means of conducting it, cholera had already almost ceased at Alexandria, and had shown itself in other various ports. Before proper quarantine arrangements against Alexandria could have been organised, no quarantine would have been self-consistent which had not been a quarantine against France, Turkey, Spain, Italy, and Germany, as well as against our own possessions of Malta and Gibraltar; and doubtless the cortegium of cholera was in Southampton long before any effective arrangements could have been called into existence for excluding it.

—J.S.

contagions is, I apprehend, this:—that they have to be dealt with like our ordinary home-bred contagions; that, for preventive purposes, no action, or at least no effectual action, can be taken by the general executive of the country; that, so far as any good is to be got out of proceedings directly against contagion, this, like the good of indirect proceedings, has to be sought in the vigour of local authorities. It therefore becomes quite essential that the position of local authorities generally, in regard of contagion, should be reviewed. As to contagions already current in the country, practically any diseased person scatters his infection broadcast almost where he will—typhus or scarlatina, typhoid or small-pox, or diphtheria; and, under present circumstances, if cholera were in a district, the patient with choleraic diarrhoea would form no exception to the general licence. I cannot say that the exceptional case of the foreign infection seems to me of more importance than the every-day case of our native diseases; but I would venture to submit that, with regard to both classes indifferently, the present unlimited licence seems urgently to demand restriction. As in the case of typhus or typhoid, so also in the case of cholera: or, to use one general description, in the case of any dangerous contagious disease: the local authority, I submit, ought to have the power of requiring from the diseased person that, in regard of residence and otherwise, he shall so conduct himself as not unnecessarily to multiply the chances of extending his infection to others. Subject to the condition that proper hospital-accommodation can be offered, the authority ought to be able to enforce, in regard of any dangerous contagious disease, that the sufferer should not be in circumstances which promote the spread of disease to the general population. This power, exercised in seaport towns in relation to the poorer classes who might arrive infected from abroad, would in effect work thus:—such persons would be debarred from resorting to the common lodging-houses and crowded tenement-houses of the town, and would (as much to their own advantage as to that of others) be constrained to go to the local hospital, there to remain till cured. How far such a power for local authorities would be delegable to them under the Quarantine Act,

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or would require special legislation, is perhaps not a question of any ultimate importance, and is one which I am not competent to discuss. It deserves notice, however, that if the power in question were vigilantly used by local authorities, and in conjunction with other sanitary powers, its exercise would not of necessity be only of local effect, but might under some circumstances contribute, even importantly, to those national purposes which quarantine is intended to accomplish.\*

\* For obvious reasons it is only to a small extent that legal restrictions can avail to prevent the spread of such contagions as are once current in the country. They can only apply to conduct by which the public health is manifestly and directly endangered, and not to all kinds of such conduct. But in proportion as the physiology of contagion gets to be better understood by the public, the influence of legal restrictions will be increased by the appeals which well-informed persons will be able to make, and to which the example of such persons ought to give force, against all reckless conduct in such matters. Conditions of lodgment, as discussed in the text, are not all that require consideration. Complaints are often made of the freedom with which persons imperfectly convalescent from contagious fevers (as, very notably, from smallpox) expose themselves in places of common resort, and a careless sending of sick children to school often does much to spread diphtheria, scarlatina, and other contagious diseases; the careless transmission of infected things to common laundries, and of course the traffic in infected rags, imply dangers of the same sort; and against all such sorts of action the public ought to have some ready means of protecting itself. So, too, as regards the use of public carriages by persons contagiously diseased: no doubt a proper organisation for the conveyance of sick persons ought to form part of the medical relief arrangements of every large town, and the use of the common public carriages ought then to be forbidden: but if, as often happens in our present circumstances, persons who have smallpox and other dangerous contagious diseases cannot be taken to hospital except in common street cabs, surely the subsequent disinfection of every such carriage might be insisted on. Other dangers are for personal, rather than municipal, precaution. For instance, the modes by which puerperal fever is spread, and the extreme and fatal sensibility of puerperal women to the contagion of scarlatina, are matters which require, both generally from the public, and specially from persons who visit from one sick room to another, far more thought than is yet given to them. Here also, I may observe, for the consideration of those whom it concerns, that our new institution of Turkish baths, used in common by swarms of persons—by some more or less for health, but by numbers also for mere enjoyment or curiosity, involves (inter alia) some awkward chances of syphilitic contagion: indeed, Turkish baths are now among recognized means of treatment for persons with constitutional syphilis, who, in some cases, have local symptoms by which the disease can be communicated: and the question whether such patients take the general run of public baths, and are among the numbers who nakedly occupy the seats and couches of common sweating-rooms, is one which may greatly concern other frequenters of such establishments.—J.S.

Essentially different from the danger which attends the migration of persons affected with cholera or its premonitory symptoms, is the possibility, illustrated by the Swansea experience of last October, that ships infected with yellow fever may introduce that infection into England. I do not pretend to say that yellow fever is absolutely non-contagious in this country: non-contagious, I mean, in the sense in which typhus and small-pox are contagious: much less do I pretend to say that it is absolutely non-contagious in climates hotter than our own. This doctrine, however, even in the extremest form in which it can be stated, is not only held by many persons of high authority who have studied the disease in its trans-atlantic strongholds, but is certainly rendered extremely probable by facts which we have observed in Europe. When Lisbon, in 1857, was being so terribly scourged by yellow fever, thousands of its population fled far and wide into surrounding districts; among those who thus fled, numbers were already incubating the disease, and of course fell with it in their respective places of refuge, more or less distant from Lisbon; in 182 cases of this description, the Portuguese Government caused inquiry to be made whether persons about the sick fugitive had shown any signs of the infection; and the answers were, that in no single case had this occurred. So again, in our Swansea experience, nothing like personal contagion seemed probable. And though undoubtedly at St. Nazaire there were a few facts which led M. Méliér to impute contagiousness to the disease, the overwhelming majority of facts pointed, even there, to an opposite conclusion, and suggested that in the exceptional instances some source of fallacy had been overlooked. Quite unquestionable, however, is the evidence that the infection of yellow fever accompanies marine traffic from land to land; and in proportion as the belief is untenable that the disease is personally contagious, in such measure the alternative must be accepted—that infectiveness is in the body of the ship. That yellow fever is a malarious rather than a truly zymotic disease, is a disease of the nature of ague rather than a disease of the nature of typhus,—that the ship which spreads infection does so

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irrespectively of the persons who are in it, whether they be healthy or diseased,—that the ferment of a local and impersonal infection clings to the ship from shore to shore, and breeds new malarious action in any congenial soil to which it comes,—that the exceptional and contingent power of persons to spread the disease is generally but a very scanty and transient power, not belonging particularly to the sick, but to the healthy in common with them, attaching perhaps mainly to their dress, and equally predicable of all absorbent things which the atmosphere of the ship has imbued;—this, it seems to me, is the doctrine of yellow fever which tallies best with our present knowledge of facts. Without pretending to dogmatise theoretically on a subject which no doubt has its difficulties, I am strongly of opinion that preventive measures based upon that doctrine are, under present circumstances, amply sufficient for the practical purposes of this country. If it were, as far as practicable, provided that, during summer weather, ships which might reasonably be suspected of yellow fever infection should not come into close relation with shore or with other shipping till they and all things in them which might carry infection, had undergone thorough disinfection, this, in my opinion, would probably suffice to prevent in future any such unfortunate occurrence as the late outbreak of yellow fever at Swansea. I append as bearing upon this suggestion [A] the regulations which were put in force by the French government on occasion of the disaster at St. Nazaire, and therewith the remarks which I submitted to the Lords of the Council on the question of the applicability of such regulations to this country. It will be observed that the suggestion which I have just given corresponds in principle to one large part of the French regulations. And there is not, in my opinion, any present reason for supposing that England would get additional security by adopting against yellow fever the system of personal quarantine which other of the French regulations enforce.

## APPENDIX.

LETTER addressed, April 19th, 1865, to the LORD PRESIDENT of the COUNCIL, by the MEDICAL OFFICER, on certain EPIDEMICS prevailing in the NORTH of EUROPE; with Supplementary Memorandum on EPIDEMIC CEREBRO-SPINAL MENINGITIS. Certain Epidemics prevailing in the North of Europe.

Whitehall, April 19, 1865.

My Lord,

I have the honour of reporting to your Lordship that the information which, under your directions, I have been receiving during the last fortnight, on the subject of certain diseases prevailing, or said to be prevailing, in the North of Europe, is now so far completed by a telegram yesterday received from Dr. Whitley at St. Petersburg, as to render possible a judgment, which I think may not be premature, on the very important question, whether this country, in its intercourse with the North of Europe, is exposed to more than its ordinary risks of being infected by disease.

The very alarming rumour which excited your Lordship's vigilance on the present subject, was to the effect that a disease of the nature of plague, coming from beyond the Ural Mountains, and causing depopulation in its course, had not only reached St. Petersburg, where it was said to be causing fearful ravages, but had spread beyond the Prussian frontier, and was prevailing, though in a less destructive form, at Dantzic and various other places in North Germany.

Telegraphic inquiries, however, which Earl Russell at your Lordship's request caused to be made of Her Majesty's ambassadors and consuls in the countries to which the rumour referred, led almost immediately to the establishment of two facts, which, while they fully accounted for the existing rumour, divested it in great part of its extremely alarming character. In the first place it was ascertained, that, though undoubtedly St. Petersburg was suffering a very great excess of sickness and mortality, yet at least the main part of the epidemic disease which was prevailing there consisted only of such fevers as are well known in this country. And in the second place it was ascertained, that, though a very frightful disease was indeed prevailing in parts of North Germany, and particularly about the Lower Vistula, this disease was altogether different in kind from the fevers which were prevailing in St. Petersburg. In proportion as time has permitted the ordinary postal communications to take place, the above-stated two facts have been established in more and more detail. And it may now, I think, be fairly assumed that there is no other important fact to be added to them.

First, as regards St. Petersburg,—the epidemic which is prevailing in that city consists of two forms of fever which are known in this country as *relapsing fever* and *typhus*. Of relapsing fever (which also, from the circumstances under which it prevails, is familiarly known by the name of *famine fever*) we have had no large experience in this country since the years 1846–48, when, in consequence of the Irish distress, the disease first became epidemic in Ireland, and next raged in Liverpool and many other of our chief towns to which its contagion was brought by Irish immigrants. Typhus, on the other hand, is probably never absent from among us. During the last two or three years, there has been an almost unprecedented amount of it in London, and, as your Lordship is aware, inquiries relating to very large epidemics of it in Liverpool, Greenock, and Bristol have during the last few months been required of the Medical Department of the Council Office. In times when relapsing fever prevails (and always they are times of national scarcity) typhus always or nearly always co-exists



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with it. It was so at Liverpool in 1847, it is so at St. Petersburg at present. The mixed epidemic, wherever it occurs, testifies to the miserable state of a starving and over-crowded proletariat; and there seems reason to believe that, if the St. Petersburg epidemic is of more than common severity, this is only in result of extremely aggravated conditions of privation, over-crowding, filth, and district-unwholesomeness, operating on large masses of the lowest population. It is probable that the relapsing fever has caused particular alarm in St. Petersburg from the fact that the disease had never before prevailed there, nor indeed been much known anywhere in Russia. But it is a disease greatly less dangerous than typhus. To persons whom they respectively have attacked in this country, typhus has been seven or eight times as fatal as relapsing fever.

Both typhus and relapsing fever are communicable from person to person by means of the general exhalations of the sick; and the danger of such contagion acquires its utmost development when masses of ill-fed population are crowded together in places which are insusceptible of ventilation.

It seems probable that the fevers now prevailing in St. Petersburg are not only extensively diffused, but, in their respective kinds, are of fully average severity. The relapsing fever is causing more than its usual proportion of deaths, and is notably attended with those inflammatory swellings which are known by the name of buboes. Although the reports which are before me do not state the relative frequency with which the latter symptom is observed, yet, from the fact of its being mentioned in a very general report on the epidemic, I infer that it has been more than commonly frequent, and doubtless it was from this circumstance that there arose the rumour of plague. It is therefore requisite to mention that buboes are by no means exclusively characteristic of plague, that severe typhus in this country is not very infrequently attended by them, and that also in our other forms of fever they are sometimes, though far less frequently, observed. The great importance, however, of the question which is involved in that symptom of buboes was a main reason for your Lordship's thinking it desirable to have an English physician's report on all the elements of the St. Petersburg epidemic; and it was therefore that under your Lordship's orders I instructed Dr. Whitley to proceed to St. Petersburg for the purpose of making personal examinations in the matter. He arrived at St. Petersburg on Saturday night last, and his telegram which I yesterday received informs me in positive terms that "nothing resembling plague has been observed."

As regards the disease which is prevailing in parts of North Germany, the case is very widely different. That disease is one of which hitherto England has had no general experience. Even in foreign medical literature mention of it is but comparatively recent, and the knowledge which relates to it is incomplete. It is a febrile nervous affection of a very painful and very dangerous kind. By us, for practical purposes, it may be regarded as a new disease; but, in truth, it has, for the last twenty-eight years been prevailing very extensively in successive small epidemics, both in Europe and in America, throughout the entire breadth of the north temperate zone. Having regard to the probability that sooner or later this disease may show itself in England, I have thought it convenient that, both for your Lordship's present reference, and for such further use as you may deem expedient, there should be compendiously stated the main facts which are yet known with regard to the disease's nature and laws of distribution; and I have accordingly prepared a special memorandum in which, by reference to foreign authorities, I endeavour to fulfil that object.

Both on account of the alarming rumours which were connected with the present epidemics in North Germany, and also with a view to collect the latest

and fullest information concerning the habits of so important a disease, your Lordship (as in the case of the St. Petersburg fevers) deemed it right that an English physician should be sent to observe and report; and, under your Lordship's orders, I instructed Dr. Sanderson to proceed for this purpose to those places about the Lower Vistula where the disease was chiefly prevailing. From him, during the last few days, I have received telegrams and letters which leave no doubt as to the identity of the prevailing disease, and establish, as I have already stated, that it has no dependence on the fevers of St. Petersburg.

In the special Memorandum to which I refer, I have stated what I can learn with regard to the communicability of the nervous disease. Your Lordship will observe that, though I hesitate to speak of the disease as incommunicable by personal intercourse, I show reason for believing that under ordinary circumstances it is not thus communicable in more than a very low degree. And Dr. Sanderson writes to me, in relation to the present epidemics, that he finds "no reason for regarding the disease as personally communicable;" that he has "met no single instance in which more than one member of the same family has been attacked; nor has there been any diffusion of the disease in any of the hospitals."

From the foregoing statement, your Lordship will have gathered that, neither as regards the fevers which are present in St. Petersburg, nor as regards the nervous disease which is occurring in North Germany, are the circumstances such as have on former occasions led to the adoption of quarantine by this country;—that, as regards the importability of the nervous disease, our danger in communicating with the Baltic ports (unless there were movement of masses of infected population) is apparently nothing, or next to nothing;—and that, as regards the Russian epidemic, our danger in communicating with St. Petersburg is only the same sort of danger as the several parts of the United Kingdom have often occasioned to one another, and are even at the present time, as regards the worst known forms of fever, daily and abundantly occasioning.

As, however, it is possible and even probable that, with the re-opening of the Baltic navigation, ships which come to our ports from Russian territory may occasionally have fever-cases on board, it is essential that, in places which this danger may affect, the local sanitary authorities should exercise peculiar vigilance against all those unwholesome conditions which favour the propagation of such disease. In this connection I would beg leave to advert to the short general Memorandum which, under direction of the Lords of the Council, I prepared in 1860, and have since then been in the habit of circulating, on the "Proceedings which are advisable in Places attacked or threatened by Epidemic Disease." As regards the class of places to which my present remarks particularly apply, it is scarcely needful to observe that the state of common lodging-houses, and of houses which are sub-let in several small holdings, ought very specially to be seen to, and that every possible care ought to be taken to provide lest they be left over-crowded and ill-ventilated. Except in connection with reckless personal association, there is little danger that febrile contagion will spread widely where the sanitary circumstances are good; but the advent of any such contagion into the poorer dwellings of a place tests, in a crucial and unflattering way, the sufficiency of their adaptation to health.

Finally, with reference to the just-mentioned danger, and to others of a like kind, it seems imperative on me that on this occasion I should bring under your Lordship's particular notice the very unsatisfactory state of our sanitary laws in everything which relates to the migration, exposure, and housing of persons who are infected with the current contagions of the country, and who, in the absence

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of proper precaution, must communicate their disease to others. Complaints are frequently made that the public health of a district is seriously endangered by the arrival (sometimes from abroad, sometimes from other parts of the United Kingdom) of patients suffering with small-pox, typhus, typhoid fever, scarlatina, or some other malignant and more or less communicable disease; or that such patients are being lodged in houses where the disease can hardly fail to spread; or that, either in states of imperfect convalescence, or even during active disease, they travel in public conveyances or expose themselves in places of common resort. In the present state of the law the authorities who are charged with the local protection of the public health are practically almost powerless against these evils; and it would be over-sanguine to imagine that, within any small number of generations, the sanitary state of the poorer dwellings of the country will be generally such that the germs of contagious disease can with impunity be imported into them. I would therefore venture to submit to your Lordship that in my opinion it deserves the consideration of the Legislature, whether the hands of local authorities might not expediently be strengthened against the evil which I have described; whether, namely, such authorities might not, under proper qualifications, be empowered to require that persons who come with dangerous communicable disease into the district should so dispose themselves, in regard to lodgment and seclusion, as not, in any fairly avoidable degree, to endanger the public health.

I have the honour to be,  
My Lord,  
Your Lordship's most obedient servant,  
(Signed) JOHN SIMON.

MEMORANDUM relating to the DISEASE which is now epidemic in parts of NORTH GERMANY.\*

Epidemic Cerebro-Spinal Meningitis.

The disease which is now prevailing epidemically about the Lower Vistula and in some other parts of North Germany, belongs apparently to the class of specific Fevers. It has for its distinguishing mark, that it involves an acute inflammatory affection of the great nerve-centres of the body—the brain and spinal cord. After death its traces are obvious to the anatomist in morbid structural states of those organs, chiefly of their surfaces and enveloping membranes; and it is from the characteristic affection of these membranes (the so-called “meninges” of the nervous centres) that the disease has got its technical name of *cerebro-spinal meningitis*. Specially in cases which have proved fatal otherwise than with extreme suddenness, the characteristic change is commonly found advanced to a degree in which it cannot well be overlooked; and, more or less generally throughout the cerebro-spinal system, the *pia-mater* (that delicate vascular membrane which is folded close about the nervous centres and their dependent nerve roots) is found in a swollen and infiltrated, or perhaps suppurating or disorganised state. For practical purposes, this state of the covering membrane of the nervous centres may be regarded as a mere index of

\* Statements of fact in this Memorandum are for the most part founded on the elaborate papers on cerebro-spinal meningitis, which are contained in M. Boudin's “*Traité de Géographie et de Statistique Médicales*,” and Professor Hirsch's “*Handbuch der historisch-geographischen Pathologie*.” The former was published at Paris in 1857, the latter at Erlangen in 1864.—J.S.

changes more or less destructive, which those centres, in their own intimate composition, have at the same time undergone; and hence it is that the essential phenomena of the disease during life consists in disturbances, more or less grave, of the functions of these all-important organs. The detail of the symptoms is not the same in all cases:—for sometimes it will be in one part of the nervous system, sometimes in another, that the onslaught of the disease begins or is most severe; and, according to minor differences of this kind, the outward signs of the disease may be more expressed in this or that section or function of the Patient—in trunk or head or limbs, in sense, in motion, in mind. But these differences are inessential. A first stage, during which the irritated organs of sense and consciousness become mere sources of racking pain and miserable restlessness and hallucination and delirium, while the muscles of the body are worked into partial cramps and tremors, and presently are tortured into all the terrible struggles of tetanus or epilepsy,—and a second stage, during which (correspondently with the more advanced disease of nerve-structure) the exhausted body lies comatose and paralysed;—two stages, thus respectively characterised, are, it seems, the sum and substance of the symptoms, when the disease stops short of being *foudroyante*. The sufferer who reaches that second stage hangs by a mere thread to life; perhaps at once to sink the little remaining distance to death; perhaps slowly and painfully to recover, though it may be only with nervous mutilation.

The symptoms with which the disease most usually declares itself are shivering, intense vertigo, headache of intolerable severity, violent obstinate vomiting, and painful muscular stiffness (which soon develops into tetanic contraction) particularly of the neck and back. And these symptoms come on together, or in close sequence on one another. While consciousness lasts, the distress in the head is incessant, and even during delirium or stupor the patient's instinctive movements show that his head is still a chief seat of pain. Tongue, pulse, and skin-temperature, are not very obviously affected. The patient's face is oftener pale than flushed, and his eyes (perhaps with reddened conjunctivæ and contracted pupils) have often a look of wild distress. In some cases the region of the stomach has been much complained of, and it perhaps deserves notice that, in a considerable proportion of cases, patients are said to have discharged ascarides from the stomach or bowels. Terrible restlessness and general muscular agitation are soon added to the other symptoms, and often there is such a sensibility of surface that every touch or movement causes agony. And now, often with more and more neuralgia, the muscular contractions become more and more uncontrollable and convulsive, and affect, as in common tetanus, all parts of the body. Deglutition becomes difficult or impossible, and the respiratory movements are rendered irregular and imperfect. The head is dragged tightly backward upon the neck, and the features are fixed in the characteristic grin of lock-jaw. Happily, meanwhile the progress of the cerebral disease is darkening the patient's consciousness, and rendering him less and less percipient of the tortures of his physical being. Delirium to some extent will probably have existed from an early stage of the disease, and now tends more and more towards stupor. And so the patient passes into coma, and into depression which is on the confines of death. To this stage he may have come almost suddenly, but generally there will have been a day or two of the former one. Before the stage of coma resolves itself in one direction or the other, six or eight days may have elapsed from the first attack, and even in this time the patient will have become very greatly emaciated. In the typhoid state in which he lies, he is apt to be profusely sweating. Sometimes the cavity of his mouth is lined with a coating which is almost

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diphtheric. More or less anæsthesia often exists, or sometimes in extreme cases a state of general muscular paralysis, or in other cases drooping of the eyelids or squinting. The pupils may be unsymmetrical, or both of them may be dilated and motionless. And now frequently the patient has eruptions on the skin,—sometimes petechial, sometimes more or less imitating the characteristic exantheme of typhoid fever, measles, or other eruptive fever, but oftenest of all in the form of herpetic vesicles about the lips.

When the disease is not in its abruptest form, death, if it occurs, is generally from the fifth to the eighth day. In the other event, the duration of severe disease cannot be rated at less than three or four weeks, and convalescence (such as is possible) may be a matter of even many months' duration.

Sometimes recovery is delayed or prevented by secondary diseases which supervene,—articular or serous inflammations or pneumonia, or inflammation of the mucous membrane of the intestines, or some other kind of complication. Sometimes the intelligence, especially the memory, is damaged for a time or for life. The hearing, which generally suffers to some extent, is sometimes permanently gone; and here, if the sufferer be an infant, he will be dumb as well as deaf for life. Vision is peculiarly apt to suffer, and, either through the central disease or by secondary ophthalmic inflammations, may be lost to one eye or to both. Sometimes it is the sense of smell which is lost. Sometimes headache continues for months. Sometimes parts of the body do not recover their common sensibility. And sometimes the patient's muscular paralysis is only imperfectly recovered from.

Marked attacks of the disease are not always made without warning. Sometimes, for hours or even days beforehand, the patient will have had vague premonitions of an attack, or, to speak more correctly, its first symptoms will have come on him gradually. Among such premonitions, slight shivering fits have been particularly observed. But often nothing of the sort can be traced. And often from a state of apparent health, amid work or sleep, or at a meal, or in the street, the patient has quite suddenly fallen into an almost explosive beginning of the disease, has rapidly passed into a state which is compared to the asphyctic collapse of cholera, and has died within twelve, sometimes even within six hours, from the attack.

It deserves notice that, while cases of the above-described gravest kind are occurring perhaps not very numerous in a place, sometimes, within the same area, or scattered over a wider one, a large number of other persons will suffer slight indications of similar nervous derangement. Headache, vertigo, muscular discomfort in the head and limbs, and attacks of chilliness, are the chief of these minor indications, which apparently bear to the graver cases the same sort of relation as epidemic diarrhoea bears to concurrent epidemic cholera, and which tend after two or three days to the crisis of a profuse general perspiration. Probably these cases are of very different degrees of severity, and are not separable by any abrupt line from the severest manifestations of the disease. It is said that in proportion to their severity they share the common character of the disease in being but very slowly recovered from.

Though cerebro-spinal meningitis in its epidemic form has hardly been scientifically described till within the last 30 years, the conclusion does not follow that in that form it is a new fact in nature. For since its epidemics are, for the most part, not on a large scale in any one place, numbers of them may have passed unobserved during the less advanced times of medical science; and well-marked cases of the disease, viewed disconnectedly, may have been called by the name of some other ailment—"fit," "hydrocephalus,"

"apoplexy," "nervous fever," "lock jaw," &c. In 1837, when its importance first began to be recognized in France, few previous epidemics of the disease were on record.\* But from 1837 till now, sometimes more in one country, sometimes more in another, the disease has been continually spoken of as manifesting itself in numerous small well-defined epidemic outbreaks. The apparent beginning was at Bayonne in 1837, and within the next 12 years, 47 epidemics had been recorded in 36 of the then 86 Departments of France. The scanty medical literature of South Italy shows that at least during the seven years 1839-45 many epidemics of the disease were occurring there. During the same and some subsequent years, renewed outbreaks of the disease in Algeria were reported. Of Spain it is at least certain that, in 1844, there was a small epidemic at Gibraltar. In Denmark there were epidemics at least in the years 1845-48. In the United States of America two epidemics were observed in 1842, and, from then probably till now, epidemics have constantly been under observation in one part or another of that vast territory. In 1854 Sweden was first reported to be suffering, and within seven years had lost more than 4,000 of its population by the disease. In Norway the disease has been prevailing since 1859. Germany seems almost entirely to have escaped till a very recent period; but of late the disease has been prevailing at least in parts of Prussia, Saxony, and Hanover, and to a small extent has shown itself in Poland. Especially in the eastern parts of Prussia, well-marked epidemics have been recorded; and it was the prevalence of such epidemics about the Lower Vistula, particularly at Dantzic and Elbing, which gave rise to the mistaken popular belief that "plague" had spread thither from St. Petersburg. Dr. Sanderson tells me that the Medical Officer-in-chief of the Circle of Dantzic reports that at least 1,000 persons have died there of the disease since Christmas. Our country meanwhile has been almost entirely without experience of the disease. In 1846, and again in 1850, something of it was indeed seen very partially in Ireland, and in the former year there was a doubtful trace of it in Liverpool.† It is possible too that we may have had small local outbreaks which have been unrecognized or unrecorded. But certainly the disease has not prevailed on a large scale in any part of the United Kingdom, and, practically speaking, is therefore almost unknown to the mass of our medical profession.

Though the causes of the disease are hitherto not exactly known, some broad ætiological generalizations about it have been made. In the first place, the disease, in whatever climate it has prevailed, has shown a very marked preference for the colder seasons of the year. Of 182 epidemics, examined in this point of view by M. Boudin, 10 were in August and September, 24 in October and November, 46 in December and January, 48 in February and March, 30 in April and May, and again 24 in June and July. In the second place, epidemics have seemed particularly apt to occur in establishments where masses of special population have been living in common domicile—as in workhouses, convict prisons, schools, and (above all) barracks. And in several

\* At Geneva in 1805, it killed 33 persons. In 1806-7 it was seen in the Prussian army. In 1807 it was at Briançon, in 1811 at Dantzic, in 1813 at Brest. In 1813-16 it visited Metz, Pont à Mousson, Sarreguemines and Mainz, as also Grenoble and Paris. In 1822 it was at Vesoul, and in 1823 at Le Mans.—Boudin, op. cit.—J.S.

† In the "Dublin Quarterly Journal" of 1846, Dr. Robert Mayne published a short Paper on the Irish experience of that year; and in the "Medical Gazette" of 1847, Dr. Whittle noticed the facts which he had observed at Liverpool. The Irish experience of 1850 was written of by Dr. McDowell in the "London Journal of Medicine" of 1851.—J.S.



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of such cases the epidemic has seemed to confine itself to one section of the establishment—to one block of building, to one floor, or to one room. It is asserted that here, as a general rule, the affected segment of population has been in overcrowded and ill-ventilated quarters. And when the disease has spread from such centres, or has independently arisen among common populations, this, almost always, is said to have been under similar unwholesomeness of circumstances. Where the epidemic has been among soldiers, officers have enjoyed almost entire immunity; and where common populations have been suffering, the disease has shown great, if not exclusive, preference for the worst-lodged classes of the community.\* Reviewing the evidence which exists upon these points, I am strongly of opinion that the best sanitary precaution which in the present state of knowledge can be taken against the disease, must consist in care for the ventilation of dwellings. But, in stating this, I must add that in some cases, according to local reports, the distribution of an epidemic has very decidedly not been governed by conditions of overcrowding and ill-ventilation. And in this connection it is important to recall the fact, that during epidemics of meningitis, and while perhaps the severe cases of the disease are all in their usual close proximity to one another, often there will be (as though from some diffused morbid influence) an extensive distribution of milder cases or threatenings of the disease beyond the area in which the severer phenomena are witnessed.

Of personal predispositions to the disease scarcely anything is known. Both sexes have suffered, though apparently the male far beyond the female. And all ages have suffered, though least of all those which are most advanced. Where an epidemic has occurred among military and convict populations, its victims have of course mostly been in the prime of life; but where among the common civil population, it has often, if not generally, shown itself least sparing of youth and childhood. In the French army, it has been thought particularly to affect recruits. The fact may prove to be unimportant, that in descriptions of the disease, record has very often been made of the patient's vomiting or otherwise discharging ascarides from his intestinal canal;—but obviously the speculation which that fact suggests extends beyond the question whether the ascarides had any direct relation to the disease, and involves the much larger inquiry whether undiscovered other influences, operating on or through the intestinal surface, may perhaps have been associated with the parasites.

The very important questions remain, whether the disease is communicable from person to person, and, if so, what are the laws of its communicability. From the large experience which has now been collected on the subject, it may, I think, confidently be inferred that the disease, if directly communicable from person to person, is communicable only in a very low degree. Such communicability as is familiar to us with typhus, small-pox, and other eruptive fevers, cerebro-spinal meningitis does most assuredly not possess. To this extent, the tendency of the disease to prevail only in small compact epidemics is in my opinion a conclusive argument. But that the disease is incommunicable cannot, I fear, at present be maintained:—for the French military experience alleges that outbreaks of it in garrisons have sometimes so definitely

\* Here, however, it is worth noting that such a preference as is described for the poorer classes of the civil population need not be solely contingent on the general crowdedness and non-ventilation of their dwellings; for commonly the worst lodged parts of the population have many other sanitary disadvantages, including the very important one of improper and insufficient nourishment.—J.S.

followed the arrival of infected soldiers from other garrisons that the arrival could not well be acquitted of contagiousness; and unless those observations have been fallacious, it must be deemed a problem of great importance to determine under exactly what conditions and circumstances the sick have thus been enabled to propagate their infection to the healthy. The principles on which such investigations ought to be conducted are now fairly understood by men of science, and it is to be hoped that the problem which I state may soon be solved. Meanwhile, in my opinion the importability of the infection of the disease cannot at the utmost be deemed more than a danger of very subordinate rank. And I think it extremely probable that, if the disease is directly communicable from person to person, or is in any manner diffusible by personal intercourse, its powers of thus spreading itself are only of so low a degree that, with ventilation and cleanliness and good sanitary appliances, they may, for practical purposes, be virtually set at naught.

It is fortunate that cerebro-spinal meningitis does not prevail in very large epidemics. For, to the persons whom it attacks, it is one of the most dangerous of diseases. In thirteen epidemics concerning which M. Boudin gives statistics, there were collectively 809 deaths among 1,304 patients; in some of the worst epidemics the mortality seems to have been as high as 80 per 100; and the disease, as now prevailing in Germany, seems to be showing at least its average, very terrible, fatality. Evidently, then, at present it can be no satisfactory task to speak of the treatment of the disease. So far as results have yet been codified, medicine seems universally to have been powerless against the disease, and perhaps in some cases to have lessened the patient's chances of recovery. The officers who have just reported to the Prussian Government on the epidemics prevailing about Dantzic advert (like many preceding writers) to the "sudden collapse which often baffles all remedies." And evidently a disease which tends to that issue will not admit that generally depressing treatment be used against it, except (if at all) with the very utmost circumspection. It is on record that one French practitioner who tried bleeding for the disease, lost 30 of his first 31 cases, while a second, using similar treatment, lost 21 out of 22; and though other practitioners have alleged that in their hands this treatment has been of good effect, certainly it could not be admissible, except under very close and careful qualifications with regard to the circumstances of its employment. Mercury has been freely tried, and seems to have been at least useless. Opium has been strongly recommended by some French practitioners, and perhaps under some circumstances has been of advantage. In various processes of disease which resemble meningitis in their nature, the local application of cold, judiciously and skilfully made, has given to modern medicine some very notable successes; and to it, more than to any known resource of the art, I should myself have been disposed to look hopefully in the present instance. Ten years ago, indeed, it was the report of an eminent German writer\* that, in epidemic meningitis, that most effective of antiphlogistics could not commonly be borne by the patient. But, more recently, improved means have been found for the medical utilization of cold.† And Dr. Thudichum (who has seen something of meningitis on the Continent, and has favoured me with a memorandum on the recent epidemics in Brouberg

\* Hasse, in Virchow's "Handbuch der Pathologie und Therapie," vol. i., part 1, p. 461.—J.S.

† Professor Esmarch's paper on the Use of Cold in Surgery (translated in 1861 for the New Sydenham Society) marks, in my opinion, an epoch in the matter to which I refer. His method of refrigeration is to use india-rubber bags made of any required shape, and filled with ice, snow, or some freezing mixture.—J.S.

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and Ottmachau) tells me that present experience in Germany is in favour of this principle of treatment.

Concerning whatever progress is to be made in the treatment of the disease, as well as concerning whatever is to be learnt of its causes, I shall continue to look anxiously to the countries where epidemics are now prevailing. As there is no country in the world where the medical sciences are better cultivated than in Germany, so it may reasonably be hoped that, during the visitation which that country is now suffering, important light may be thrown on the causes, prevention, and treatment of a disease which hitherto is most imperfectly understood. It may also be hoped that the course which the Lords of the Council have taken, in directing observations to be made of the present foreign epidemics, will ensure for this country an immediate participation in whatever useful knowledge our German contemporaries may acquire.

April 19, 1865.

(Signed) JOHN SIMON.

#### From the Ninth Report to the Privy Council, 1866.

[The Ninth Report comprises a section relating to Public Vaccination which has appeared in Vol. I., pp. 366-70. In this report observations are continued on the Distribution of Disease in England, under which uniform heading a description is given of Dr. Buchanan's most important investigations and discoveries respecting the Relation of Phthisis to Soil Moisture. The report contains sections relating to Proceedings against Cholera under the Diseases Prevention Act; the Sanitary Act of 1866; and the Cholera Conference at Weimar. Together with this report of Mr. Simon's are reprinted parts of the Appendix which were written by himself.—ED.]

#### DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED—*cont.*

Works of  
sanitary im-  
provement in  
England.

The inquiry of this department into the results hitherto obtained by local authorities in their endeavours to improve the public health within their jurisdiction has been among the most important and most interesting which I have had, under the Lords of the Council, to superintend. For my Lords, in their sanitary jurisdiction, can fulfil no higher usefulness than that of making new local experiences conducive to general enlightenment. And here was emphatically a case where that function required to be fulfilled. Certain of our English proceedings, specially our modern works of town-drainage with water-supply, have been great popular experiments in the

management of the public health: experiments, it is true, Works of  
which medical science could not deem of doubtful promise: sanitary im-  
but not the less—to the popular mind—experiments which improvement in  
must be judged by their actual fruits. Till the sanitary England.  
experience of our best-cared-for populations had been given  
fully and frankly to the world, experience ripe enough for  
critical and conclusive judgment, the example of such popula-  
tions could not be of general influence, nor could the advocates  
of sanitary improvement establish that their case was com-  
plete. The public, therefore, and not only our own public, but  
also the public of other European states, has long been anxious  
to possess such information as the present inquiry has aimed  
at. It was essential, however, that the inquiry should not be  
prematurely made; and it was not till two years ago that I  
felt myself entitled to hope that the undertaking could be free  
from some such reproach. In 1865 I submitted to their Lord-  
ships that the inquiry might now, in my opinion, be made  
with the certainty of giving valuable, though of course not  
final, information; and their Lordships thereupon authorized  
me to institute the inquiry, with the assistance of Dr.  
Buchanan, as inspector. In my last annual report it was  
adverted to as then in progress, and it has now been conducted  
to a conclusion. It has related to 25 towns with an aggregate  
population of more than 600,000 persons; and though in some  
of the 25 towns structural improvements have but very  
recently been made, in others such improvements have been  
in action for seven or eight years and upwards.

Anyone who would do justice to the very remarkable mass  
of evidence which this inquiry has elicited must study the  
25 cases separately and in detail; for only thus can the  
circumstances be appreciated which, sometimes by exagger-  
ating, sometimes by counteracting or concealing, particular  
investigated results, give more or less of exceptionality to  
parts of many of the cases, and render the task proportionately  
difficult to speak of the 25 cases as of one.

Into the annexed table however (pp. 273-4) I have abstracted  
those numerical results on which, when duly corrected, the  
broadest of our generalisations in the matter of the inquiry  
repose. And as an introduction to the reader's detailed study

Summary  
Table at  
pp. 273-4.



Works of  
sanitary im-  
provement in  
England.

of Dr. Buchanan's report, I may here briefly draw attention to the successive columns of that table.

The column which I have headed with the letter A shows for each place in the list what difference there has been, since sanitary works have been constructed, in the *General Death-Rate* of the population. These "general" or "total" death-rates—*i.e.* rates which tell how many deaths per given population have occurred in the given time *from all causes* together and *at all ages* together, do not admit of such exact interpretation as rates in which the causes and the ages are distinguished; but of course the latter, more discriminative, death-rates tend entirely to lose their value in proportion as the distinctions which they represent have not been accurately drawn by the original recorder of facts. Registers of causes of death are (as I shall hereafter explain) very far from being uniformly trustworthy; and thus cases often arise where a comparison of general death-rates is the most instructive comparison which can be made; assuming always here that numbers of population are known, and that ages are in like relative quantities, and that notes of important epidemic disturbances are given. Subject to these very obvious cautions, a comparison of general death-rates is a rough and ready, but fairly trustworthy, comparison of degrees of health. In this point of view I refer to column A; observing that column B gives the general death-rates of A *minus* the inconstant influence which has been exerted by the chief infantine epidemics; and similarly that column E gives means for eliminating from A the influence of the cholera-epidemics of 1848-9, 1854, and 1866.

The columns C to G inclusive are for comparing (as far as practicable) the quantities of particular kinds of death caused in each of the places in the two compared periods. Such "special death-rates," used with great caution, yield the most useful of all possible conclusions as to changes wrought in the public health: but the utmost caution in using them is indispensable, because the detailed statements which they purport to sum up are often very unequally trustworthy. The fallacies to which they are peculiarly open arise in the present and past states of our system of death certification. The law

has never required that causes of death should be medically certified; and the result has been that certificates of causes of death (in varying proportions at different times and in different places) have been given by unskilled persons in such quantity, and often by skilled certifiers with so little view to statistical uses, that our most authentic (registered) information as to causes of death cannot ever be accepted without some misgiving. Further, as the quantity of non-medical certification of causes of death is probably much less now than it was (say) 20 years ago, and as likewise the discrimination and naming of diseases within the ranks of the medical profession itself has within the same time much improved, so in the annexed table any half-column which gives special deaths "after the works" may often, as compared with its fellow "before the works," represent a higher mortality than is its due; or, in other words, deaths which ought to have come within the statistics of these special columns are more likely to have gone astray in the years "before the works" than in the years "after the works." This may particularly apply to columns C and D. And I am disposed to believe that if they (especially D) were free from that source of fallacy, the evidence of the successful towns might be much more harmonious than it is.

In reading column H, the possibility has to be borne in mind that the relative quantity of infantine population in a place may have varied from time to time, and that the number of the infantine deaths in proportion to the population may in consequence have varied, independently of any variation in the local health. In Croydon, for instance, the general healthiness has been very importantly improved; but, if column H were read without the requisite interpretation, it would seem that the death-rate of infants in Croydon had increased; the fact no doubt being that Croydon, with its rapid increase of population, is having an exceptionally high birth-rate, and that its infantine population must bear to the entire population a very much higher proportion than it bore in 1845-50.

Subject to cautions such as the above, the table will pretty well speak for itself. And of everything which seems excep-

Works of  
sanitary im-  
provement in  
England.



Works of  
sanitary im-  
provement in  
England.

Cardiff.

tional or contradictory in it, detailed criticism, and nearly always (I think) very satisfactory explanation, will be found in the ample details of Dr. Buchanan's laborious and most accurate report. It will be useless for me here to dwell on points of this sort; but I need not refuse myself the very great satisfaction of referring to some of the splendid results which are recorded there.

Foremost, I must name CARDIFF. Of the monstrous mortality which that town suffered before its sanitary works were constructed, nearly a third part has now ceased. The death-rate by typhoid fever has fallen from  $17\frac{1}{2}$  to  $10\frac{1}{2}$ ; and that by diarrhoea from  $17\frac{1}{4}$  to  $4\frac{1}{2}$ . The death-rate by cholera in 1848-9 was 208; in 1854 it was 66; in 1866 it was  $15\frac{1}{2}$ . The results obtained in Cardiff are the more creditable to those who have wrought them, as the difficulties to be conquered were specially great. The authorities of the place have done a great public service, and set an admirable example; not least in their choice of a medical officer, and in their confidence in him whom they have appointed. I can have few happier duties in my office than that which I now fulfil, in referring to the terms in which Dr. Paine is spoken of by Dr. Buchanan, as formerly (in my 7th report) by Dr. Hunter, and in expressing my belief that Cardiff and England are already indebted to his zeal and efficiency for the saving of many hundreds of lives.\*

Newport.

In gross results NEWPORT is at present not far below Cardiff; but, on the one hand, the task of its improvement has, I believe, been far easier; and, on the other hand, so

\* Of the other 24 towns reported on, only four, Leicester, Newport, Merthyr, and Bristol, have given themselves the advantage of the appointment of a medical officer of health; and in Leicester alone is the appointment more than five years old. Dr. Buchanan, in these four cases, praises the exertions of the respective officers, Dr. Moore, Dr. B. Davies, Dr. Dyke, and Mr. D. Davies. In several other cases, local medical practitioners have given their fellow-townsmen valuable unpaid services, sometimes of a laborious kind, and have thus greatly promoted sanitary progress. I may specially name Drs. Westall and Carpenter, of Croydon; Mr. Rumsey, and Drs. Wright and Wilson, of Cheltenham; and Mr. Middleton, of Salisbury. Very efficient voluntary aid to sanitary progress has also been rendered in Macclesfield by Mr. May, the clerk to the board of guardians, and in Ely by Mr. Marshall, the superintendent registrar of the district.—J.S.

much amendment still remains to be made in Newport, that Newport. I suspect more share of statistical accident in its present figures. If infantine epidemics (which here might cause some ambiguity) be excluded, the reduction on the former mortality is about 32 per cent. in Newport against about 35 per cent. in Cardiff. Typhoid fever and diarrhoea together have fallen from about 27 to about 17. The cholera-rate was 112 in 1848-9, and in 1866 was 12. The principal improvement in the health of the place seems to have been consequent on a better water-supply which was given about 18 years ago.

In each of the three towns of CROYDON, MACCLESFIELD, and SALISBURY, a reduction of 20 per cent. on the previous local death-rate has been obtained. The rates of typhoid fever and diarrhoea have diminished about as follows:—in Croydon, from 25 to  $12\frac{1}{2}$ ; in Macclesfield, from  $25\frac{1}{2}$  to  $19\frac{1}{2}$ ; in Salisbury, from 14 to 4. The cholera rate in Salisbury was 180 in 1849; in 1854 it was  $14\frac{2}{3}$ ; in 1866 perhaps 1.

Of few places in the list is the progress, all things considered, more pleasing and hopeful than that of MERTHYR. This place used to be abominable. It had almost the unwholesomeness, with but a fraction of the apology, of Liverpool. In our statistics for 1851-61 it showed every possible evidence of sanitary neglect; in fever, in diarrhoea, in cholera, in small-pox, in phthisis and other lung-diseases, in mortality of children, test it how one would, it always was conspicuously bad; and when medical inspections were made there, every report told the same lamentable story of sanitary nonfeasance to the utmost. But now improvement has fairly begun. Till 1861 its steps were at the best leisurely, but since 1861 they have been accelerated. Above all, since that date, water, which used to be cruelly scant and disgustingly foul, has been replaced by a good and ample supply. And now a system of sewers has just been completed. The results hitherto obtained—results, namely, from improved removal of nuisances, from abatement of over-crowding, and above all from the purer water supply, are, that the present mortality is a fifth less than the old; the death-rate from typhoid fever and diarrhoea has fallen from 33 to 15; and the death-rate from cholera, which in 1848 was 267, and in 1854 was 84, was in

MerthyrTydfil. 1866 only 20. As an officer of health has now (since 1864) been appointed, and as further structural works are now coming into operation, I confidently expect and hope that a few years hence a further great reduction will have been made in the still excessive mortality of Merthyr.

Brynmawr. BRYNMAWR, on a small scale, is a most creditable case of sanitary improvement. Paving, thorough sewerage, good water-supply, constant attention to nuisances and removal of filth, have been the means employed; and they have succeeded against some difficulties. Brynmawr saves 15 per cent. on its former general mortality. Its death-rate by typhoid fever and diarrhoea has fallen to about half what it was. Cholera, which in 1849 killed 1 per cent. of the population, has since then done no execution.

Banbury. Ely. BANBURY has saved  $12\frac{1}{2}$  per cent. on its former mortality, and ELY, according to two different estimates of its population, 10 or 14. In Ely typhoid fever, and in Banbury both typhoid fever and diarrhoea, are but half as fatal as they used to be.

Dover. Of places where the savings have hitherto been less considerable (and in many this depends on the fact that the previous mortality was less excessive) four of the most important may be particularly noticed. DOVER has only saved 7 per cent., but this has been on a death-rate previously moderate for an unreformed town; and the improvement includes a reduction of the rate of typhoid fever and diarrhoea from  $23\frac{1}{2}$  to 16.

Leicester. Its cholera-rate, which in 1849 had been 40, and in 1854 10, was in 1866 only  $4\frac{1}{2}$ . LEICESTER had and still has a high death-rate; but a diminution, though only a small one, has been made during the few years that the works have been in action, and the fatality of typhoid fever is little more than half what it was.

Bristol. In BRISTOL (including Clifton) the full completion of works has been so recent that the time had certainly not come for a conclusive inquiry as to their results; and also from local reasons the statistics cannot be so expository as in most other cases; but even now there are proofs that the health of the town has been advantageously influenced by such of the works as were first in operation; and it must be remembered that in so large a town as Bristol, important

absolute savings of life result from even small percental Bristol. reductions of mortality. Excluding infantine epidemics, the general mortality is reduced about  $4\frac{1}{2}$  per cent. Typhoid fever and diarrhoea have lost about a fifth of their fatality. The cholera death-rate was 82 in 1849, 11 in 1854,  $1\frac{1}{2}$  in 1866. The general death-rate of CHELTENHAM is reduced not quite a Cheltenham. twentieth part; but then its original rate was less than most of the reformed rates in our table; and its death-rate by typhoid fever, now  $4\frac{3}{4}$ , was originally only 8.

In other places than those I have named, the reduction of typhoid fever has been generally not less than in the above cases. The death-rate, namely, has fallen in WARWICK, from Warwick. 19 to 9; in PENRITH, from 10 to  $4\frac{1}{2}$ ; in STRATFORD, from  $12\frac{1}{2}$  Penrith. Stratford. to 4; in ALNWICK from  $13\frac{1}{2}$  to  $8\frac{2}{3}$ ; in MORPETH, from  $16\frac{1}{2}$  Alnwick. Morpeth. to 10; in ASHBY, from  $13\frac{1}{3}$  to  $5\frac{3}{4}$ . Anyone who studies the Ashby. figures of column C, and not least (with Dr. Buchanan's comments) the few exceptional facts which are represented there will find in them a practical lesson which it is absolutely impossible to misunderstand. And scarcely less instructive is column D, though unfortunately with a larger number of exceptions; some of which, however, I suspect to be deceptive through fallacies already referred to. Column E is also one which at the present moment may be read with more than ordinary interest; showing how the power of epidemic cholera has declined, in face of the structural improvements which have been in progress.

These results, and some others which the table shows, might, I think, be most confidently anticipated; for cholera and typhoid fever, and other endemic bowel affections, are well known to stand in intimate ætiological relation to the pollution of air and soil and water with decaying excremental matters; and our statistics, unless they had been fallacious, could hardly have failed to show a diminished liability to these diseases in places where air and soil and water have been dis-polluted by sanitary administration.

But in contrast with columns which only confirm previous knowledge, columns F and G, to which I have not yet adverted, record facts for which I was not in any degree prepared. These columns, namely, appear to indicate a



Diminution of  
Phthisis in  
certain of the  
towns.

partial dependence of PULMONARY PHTHISIS on some of the unwholesome conditions which have been removed. And when detailed examination is made of the cases which give that indication, and they are compared with the different class where phthisis has not lessened its amount, the novel and most important conclusion suggests itself, that *the drying of soil, which has in most cases accompanied the laying of main sewers in the improved towns, has led to the diminution, more or less considerable, of phthisis.* The facts which are yet in evidence seem most strongly to support this conclusion, which, should it be substantiated, will constitute a very valuable discovery evolved by Dr. Buchanan from the inquiries here reported on. In the adjoining table, or in the table [A] which Dr. Buchanan particularly gives to this matter, it will be seen that the reduction of phthisis, where certain works have been executed, is far too large and far too general to be regarded as an accidental coincidence. The reduction, namely, on the death-rates by phthisis in the first fifteen towns in Dr. Buchanan's table, are as follows:—Salisbury, 49 per cent. of its previous rate; Ely, 47 per cent.; Rugby, 43; Banbury, 41; Worthing, 36; Macclesfield, 31; Leicester, 32; Newport, 32; Cheltenham, 26; Bristol, 22; Dover, 20; Warwick, 19; Croydon, 17; Cardiff, 17; Merthyr, 11. And the fact that in some of these cases the diminished fatality of phthisis is by far the largest amendment, if not the only one which has taken place in the local health, becomes extremely interesting and significant, when the circumstance is remembered that works of sewerage, by which the drying of soil is effected, must always of necessity precede, and do indeed sometimes precede by years, the accomplishment of other objects (house-drainage, abolition of cesspools, and so forth) on which the cessation of various other diseases is dependent. Thus, as regards the two largest populations concerned in this question, those of Bristol and Leicester;—no doubt the comparative smallness of effect hitherto produced on the general and diarrhoeal death-rates of these towns may (so far as it is not fallacious) be referred to the shortness of time for which finished constructions have been at work for the detailed dis-pollution of houses and their dependencies; but a reduction already of a sixth in the phthisis

Diminution of  
Phthisis in  
certain of the  
towns.

mortality of Bristol, and a reduction of a fourth in the phthisis mortality of Leicester, are apparently connected with the fact that, in both towns, main sewerage on a large scale, with more or less drying of soil, has existed, in comparison, for many years. And Rugby which, long as it has been at work, has not yet succeeded in getting rid of endemic diarrhoea and typhoid fever, shows at least this result of its main drainage works, that its phthisis mortality has fallen 43 per cent.

Reviewing the inquiry as a whole with reference to the objects for which it was undertaken, I think I may venture to say that it has been very fairly successful. True, that the results which have been elicited are not in all cases equally intelligible, nor, of course, in all cases equally satisfactory. But, on the whole, the results are such as can be well understood by all who will somewhat carefully consider them, and such as deserve to be well pondered by the local authorities of the country. If hereafter other inquiries of the same sort are made, the investigator will doubtless have an easier task than we have now had; for the quality of the rough material of medical statistics is always in course of improvement. And also he will probably have a far simpler exposition to make; for, when the evidence of longer periods can be collected, apparent exceptions become fewer, and the meaning of evidence far less doubtful. Meanwhile, however, the present records may fulfil very important provisional uses; not only to confute persons who have despaired, or affected to despair, of any great preventability of disease; but still more to justify in the public eye, and to encourage in some of the noblest of human labours, those who for long weary years have been spending their powers in this endeavour, and to whom surely it will be the best of rewards to see demonstration of the good they have wrought.

In conclusion I may be permitted to mention, though not strictly within the business of my present report, that the indications elicited by Dr. Buchanan as to the existence of some ætiological connexion between phthisis and local dampness of soil, have seemed to me so important that I have submitted to my Lords the expediency, in my opinion, of further inquiries in that special direction; and, as their Lordships have been

Results of the  
inquiry useful  
though not  
final.



pleased to direct such further inquiries to be made, I hope to be able in some future report to bring other facts into evidence on the subject.

PROCEEDINGS AGAINST CHOLERA UNDER THE DISEASES PREVENTION ACT AND OTHERWISE.

Proceedings  
against  
cholera.

The proceedings which the Lords of the Council took in 1866 under the extraordinary powers of the Diseases Prevention Act (including, of course, the proceedings which were preliminary to putting this Act in force) were rendered necessary by the renewed presence of Asiatic cholera in England.

A year ago, when making my report for the year 1865, I had to state that, during the period then reported on, cholera had once more become widely prevalent in Europe, and had already, though but in very small extent, shown itself in this country. As matter of anticipation it was then scarcely less than certain that the year 1866 would not come to an end without cholera having been seen here in much larger amount, And that antecedent probability has now been justified by the result. We suffered during 1866 very considerably from the disease; and even yet it would be premature to say that our share of suffering from the present fourth extension of Asiatic cholera is at an end.

Rise and pro-  
gress of cholera  
in England in  
1866.

The history of the disease in England in 1866, and of the proceedings taken by my Lords in relation to it, is, briefly, and so far as the facts came before this department, as follows.

On the 28th of April a first case was reported from Bristol, that of a trader who had arrived there sick from Rotterdam.

On May 15th telegrams from Liverpool and Birkenhead reported that the disease was prevailing on board certain vessels in the Mersey among German and Dutch emigrants, who, with a view to crossing the Atlantic for New York, had come in flocks, travelling rapidly from the continent, often from infected parts of it, by way of Hull, Grimsby, and other of our north-eastern ports, and had now fallen ill at their port of embarkation. Much alarm was occasioned by this outbreak; the more, as new arrivals of the same sort were occurring from day to day; and my Lords, under the circumstances,

TABLE WHICH RESULT FROM PROPER

pulation, for each of the compared periods.								
Population of in 1861.	aics.	F  Phthisis.		G  Phthisis and other Pulmon- ary Diseases of Women aged 15-55.		H  Death-rates of Infants under one year of age.		
		1866.	Before the Works.	After the Works.	Before the Works.	After the Works.	Before the Works.	After the Works.
160,714	1½		31	: 25½	16	: 13½	54	: 52
68,056	-		43½	: 29¼	17¾	: 16	84½	: 81
52,778	20		38¾	: 34½	15½	: 13¾	80½	: 61
39,693	-		28¾	: 21¼	15	: 11¾	40½	: 37
32,954	15½		34¾	: 28¾	all ages and both sexes 66 : 58¾		?	: ?
30,229	2		?	: ?	all ages and both sexes 59½ : 49		?	: ?
29,417	-		32	: 35¾	16½	: 16¾	71	: 65½
27,475	-		51½	: 35¾	28½	: 22	77½	: 59¾
24,756	12		37	: 25	14	: 12½	67¼	: 53¼
23,108	4¾		26½	: 21¼	13½	: 11¼	47¾	: 46¾
10,570	-		40	: 32½	16¾	: 14¾	51¼	: 46¾
10,238	-		26¾	: 15¾	14¾	: 9½	53	: 45
9,414	-		30¾	: 29	13¼	: 14	?	: ?
9,030	-		44½	: 22¾	all over 20 both sexes 53½ : 38½		43	: 40
8,664	-		32½	: 32¾	12¾	: 14½	44	: 42¾
7,847	-		31	: 16¾	all ages; both sexes 48 : 36		50½	: 42½
7,818	-		28½	: 16¼	15	: 7	42½	: 45
7,189	-		39½	: 37½	17	: 19½	55½	: 55½
6,823	-		26¾	: 26½	14	: 13	46	: 48
6,494	-		28½	: 33	13½	: 17½	?	: ?
6,334	-		28½	: 30	14¾	: 13¾	76½	: 69
5,805	-		30½	: 19½	14¾	: 9¼	24¼	: 22½
4,490	-		30½	: 28	14	: 14¾	56	: 57½
3,840	-		25½	: 31½	16	: 13	48	: 31

TABLE REFERRED TO (pp. 263-272 & 297) AS ILLUSTRATING THE IMPROVEMENTS OF PUBLIC HEALTH WHICH RESULT FROM PROPER WORKS OF DRAINAGE AND WATER-SUPPLY.

DEATH-RATES PER ANNUM, total and particular, per 10,000 of general Population, for each of the compared periods.																			
Population in 1861.	TOWNS in order of their Population.	Periods for which the Death rates are compared.	A		B		C		D		E			F		G		H	
			General Death- rates.	General Death- rates, after ex- cluding small- pox and other infantine epidemics.	Typhoid Fever.	Diarrhoea, excluding Cholera so called.	Cholera in each of the three Epidemics.	Phthisis.	Phthisis and other Pulmon- ary Diseases of Women aged 15-55.	Death-rates of Infants under one year of age.									
											Before the Works.	After the Works.	Before the Works.	After the Works.	Before the Works.	After the Works.	Before the Works.	After the Works.	Before the Works.
160,714	BRISTOL -	1847-5 : 1862-51	245½ : 242	215 : 205¾	10 : 6½	10½ : 9½	82 : 11 : 1½	31 : 25½	16 : 13½	54 : 52									
68,056	LEICESTER -	1845-51 : 1862-4	264 : 252	236½ : 225½	14½ : 7¾	16 : 19½	1 : 10 : -	43½ : 29¼	17¾ : 16	84¼ : 81									
52,778	MERTHYR -	1845-55 : 1862-5	332 : 262	292½ : 221¼	21½ : 8½	11½ : 6¼	267 : 84 : 20	38½ : 34½	15½ : 13¾	80½ : 61									
39,693	CHELTENHAM -	1845-57 : 1860-5	194 : 185	182 : 172	8 : 4¾	8½ : 7	- : - : -	28¾ : 21¼	15 : 11¾	40½ : 37									
32,954	CARDIFF -	1847-54 : 1859-66	332 : 226	294 : 191½	17½ : 10½	17¼ : 4½	208 : 66 : 15½	34¾ : 28¾	all ages and both sexes 66 : 58¾	? : ?									
30,229	CROYDON -	1845-50 : 1857-64	237 : 190	207 : 178¼	15 : 5½	10 : 7	27 : 21 : 2	? : ?	all ages and both sexes 59½ : 49	? : ?									
29,417	CARLISLE -	1845-53 : 1858-64	284 : 261	244 : 225	10 : 9¾	11½ : 12½	22 : 6 : -	32 : 35½	16½ : 16¾	71 : 65½									
27,475	MACCLESFIELD -	1845-52 : 1857-64	298 : 237	263½ : 217½	14½ : 8½	11½ : 11	9 : 1 : -	51½ : 35½	28½ : 22	77½ : 59½									
24,756	NEWPORT -	1845-49 : 1860-65	318 : 216½	275 : 187½	16½ : 10½	11 : 6½	112 : 1½ : 12	37 : 25	14 : 12½	67¼ : 53¼									
23,108	DOVER -	1843-53 : 1857-65	225½ : 209	203 : 187	14 : 9	9½ : 7	40 : 10 : 4¾	26½ : 21¼	13½ : 11¼	47¾ : 46½									
10,570	WARWICK -	1845-55 : 1859-64	227 : 210	209¾ : 191½	19 : 9	5¾ : 8	10½ : - : -	40 : 32½	16¾ : 14¾	51¼ : 46¾									
10,238	BANBURY -	1845-53 : 1857-64	234 : 205	214 : 184½	16 : 8½	11½ : 5½	2 : 1½ : -	26¾ : 15¾	14¾ : 9½	53 : 45									
9,414	PENZANCE -	1843-50 : 1856-65	221 : 222	197½ : 200½	7½ : 8	5½ : 9½	- : - : -	30¾ : 29	13½ : 14	? : ?									
9,030	SALISBURY -	1844-52 : 1857-64	275 : 219	253¾ : 198½	7½ : 1¾	6½ : 2½	180 : 14½ : -	44½ : 22¾	all over 20 both sexes 53½ : 38½	43 : 40									
8,664	CHELMSFORD -	1843-52 : 1855-65	196½ : 215	180 : 187½	12 : 12¾	7 : 8	4 : - : -	32½ : 32¾	12¾ : 14½	44 : 42¾									
7,847	ELY -	1845-52 : 1859-64	228 : 205½	210 : 186¼	10¾ : 4½	3¾ : 4¼	- : 22 : -	31 : 16¾	all ages; both sexes 48 : 36	50½ : 42½									
7,818	RUGBY -	1845-51 : 1855-64	191 : 186	164 : 164½	10 : 9	2½ : 7½	- : - : -	28½ : 16¼	15 : 7	42½ : 45									
7,189	PENRITH -	1845-52 : 1856-64	253½ : 250	235½ : 230½	10 : 4½	3½ : 4½	9½ : 2½ : -	39½ : 37½	17 : 19½	55½ : 55½									
6,823	STRATFORD -	1845-53 : 1860-64	217 : 202	212¼ : 178	12½ : 4	11½ : 5¾	- : - : -	26¾ : 26½	14 : 13	46 : 48									
6,494	ALNWICK -	1845-51 : 1856-64	262 : 247	240 : 221½	13½ : 8¾	7 : 4¾	205 : - : -	28½ : 33	13½ : 17½	? : ?									
6,334	BRYNMAWR -	1843-52 : 1856-65	273½ : 232½	232 : 209	23½ : 10¼	5 : 4¾	100 : - : -	28½ : 30	14¾ : 13¾	76½ : 69									
5,805	WORTHING -	1843-52 : 1857-65	155 : 153	139 : 136½	7½ : 9¼	4¾ : 5½	- : - : -	30½ : 19½	14¾ : 9¼	24¼ : 22½									
4,490	MORPETH -	1845-52 : 1856-64	262 : 247	234 : 225	16½ : 10	8½ : 14½	14 : 11½ : -	30½ : 28	14 : 14¾	56 : 57½									
3,840	ASHBY -	1845-51 : 1855-64	216 : 202½	213 : 184	13½ : 5¾	4 : 8½	- : - : -	25½ : 31½	16 : 13	48 : 31									
S																			

thought it expedient to put the Diseases Prevention Act in force for the endangered places. An inspector (Dr. Buchanan) was also sent down to advise and assist as might be necessary; and the authorities acted with vigour and judgment. The outbreak, so far as England was concerned, soon came to an end; but the subsequent progress of the emigrants was unfortunately not unattended by cholera. Indeed, in several cases, vessels such as the above, leaving in apparent health, suffered during their voyage cholera-deaths among their passengers and crew, and were of course very dangerous arrivals for their port of destination.

Rise and progress of cholera in England in 1866.

Within the next few days after the 15th my Lords were apprised of the first two cases of what afterwards became a serious epidemic at Swansea; and single cases in various other parts of the country were also notified to them. Anxiety became general in the country; and there was much correspondence with local authorities, often on precautions to be taken against the disease, or provisions to be made for treating it, and often on questions of jurisdiction and responsibility.

On June 15th my Lords were informed that the Peninsular and Oriental Company's steamship "Poonah" had arrived at Southampton with a case of cholera on board, and that several other cases had appeared in the town. On the 29th two deaths were reported by telegram to have happened at Goole, whither clearly the disease had been imported from Antwerp. On the 30th three deaths were reported to have occurred at Northwich in Cheshire, and on the same day a case of cholera occurred at Shields on board the "Clio," from Hamburg. On July 3rd a case was reported to have happened at Harwich, on board the "Redstart," from Brussels; and on the same day, from Brixham, the death of the captain of a coasting vessel was reported.

Evidently England was now being infected in many different directions, and could hardly hope to escape a serious extension of the disease. Reports of new centres of infection became more and more frequent; and on July 14th my Lords felt that the time had come for putting the Diseases Prevention Act in force throughout the whole of England and Wales. They accordingly now issued their Order for that purpose.



Rise and progress of cholera in England in 1866.

And henceforth ample powers of medical relief (not restricted to paupers) were exercisable by local authorities throughout the country.

On July 18th, from Poplar, the first cholera death in the metropolis was reported. Two days afterwards my Lords learnt that already there was an alarming proportion of cholera cases in parts of East London; and on the 21st the secretary of the London Hospital reported that the resources of that most useful institution were being overtaken by such claims for admission as attested a very terrible epidemic of cholera. For details as to this epidemic, and its probable cause, I may refer to a final report on it made by Mr. Radcliffe, which I subjoin [A].

Hitherto the proceedings of local authorities under the Diseases Prevention Act had been discretionary; but now, with the increased dimensions of the danger, my Lords thought it their own duty to define and require, by such regulations as the Act empowers them to make, the specific services which local authorities ought to be rendering to the public. Accordingly, on the 20th and 21st of July, their Lordships issued such regulations: viz., a first set, applicable to the three unions of the City of London and to all extra-metropolitan unions and parishes, and a second set, applicable to all places within the scope of the Metropolis Local Government Act; the distinction being that in the first-named class of places the regulations had to be locally administered by the authorities of Poor Law relief, whereas, in the second-named class, the local authorities are the Vestries and District Boards of the not-city parts of London.\* Copies of the two sets of

\* Section xi. of the statute, 23 & 24 Vict. c. 77., enables the Lords of the Council to vary, in certain cases, the ordinary effect of the Diseases Prevention Act as to the authorities by which the Act is to be executed. The general intention of Parliament has been (and for very obvious reasons) to vest the local administration of the Diseases Prevention Act in the hands of the ordinary administrators of Poor Law relief. But Parliament, in 1860, when reconsidering this subject, acceded to the wish of the vestries and district boards of London, that the not-city parts of the metropolis should be dealt with on a different plan, and that here the nuisance authorities, since they are advised by medical officers of health, should be the local authorities for administering the Diseases Prevention Act. It was obvious that the argument on which this exception was conceded might apply to some other places; but Parliament did not see fit to name any other exceptions to its rule. It, however, vested in the Privy Council the limited discretion to which I here refer, viz., that in places where special

regulations, together with an amendment which they received in their shipping clauses some weeks later (when the passing of the Sanitary Act, 1866, had first rendered such an amendment possible) are subjoined. With the issue of these regulations, a memorandum which I had prepared as to their application, and generally as to precautions which ought to be taken against cholera, was published and extensively circulated; and, with this, a detailed memorandum on measures of disinfection, as well as our general memorandum on precautions against epidemic disease. Copies of these memoranda are subjoined [A].

The epidemic affection of England was now rapidly tending to its maximum of diffusion, and for some weeks the applications of all sorts made to the department were very numerous. The greatest number of cases of cholera in England on any one day in the year may possibly not have been reached till about the first week of September; but the greatest quantity of alarm on the subject had certainly been some weeks earlier. After the end of September the disease rapidly died away throughout the country; making, however, here and there, occasional small fresh outbreaks even down to the end of the year.

I am not able to say what during 1866 was the total fatality of cholera in England; but from the Registrar-General's report of the returns made to him, I learn that in the three months, July, August and September, 10,365 cholera deaths were registered, in addition to 9,570 deaths by diarrhœa. And a table which I subjoin [A]—a sample of the weekly accounts which were compiled in this department from the returns of local officers during the epidemic, will serve to show, at

nuisance authorities exist in distinction from Poor Law authorities, the Lords may, if they see fit, authorize such nuisance authorities to be, instead of the Poor Law authorities, the administrators of the Diseases Prevention Act. The single place in regard of which my Lords saw fit to exercise this power was Southampton; their Lordships being here strongly moved by two authorities whom the question concerned, and finding that the local circumstances were so peculiar as to justify the exceptional treatment. The general view taken by their Lordships, after careful consultation with the Poor Law Board, was that cases must be extremely rare in which the transfer would not be disadvantageous.—J.S.

least approximately, what parts of England were suffering from cholera at the time when probably this infection was the most widely diffused in the country.

Proceedings of  
the Privy  
Council as to  
cholera.

The proceedings which my Lords took in 1866 with reference to the general danger of cholera in England have already been stated. With reference to the particular local epidemics, my Lords proceeded almost invariably by correspondence alone. Their power of engaging medical inspectors, closely limited by circumstances as it is, would have been utterly insufficient for the crisis, if they had pretended, otherwise than in very exceptional cases, to communicate by this personal agency with local authorities. And even apart from this consideration, it was to be remembered that any too liberal employment of departmental inspectors on local service might be construed as exonerating local authorities from responsibilities which are properly theirs. The few occasions on which inspectors were employed with direct reference to outbreaks of cholera were principally in or near the metropolis. The East London epidemic was of such magnitude and concentration as peculiarly to require the vigilance of the department, and to justify any assistance which it could give to local authorities; so at various times Dr. Seaton, Dr. Buchanan and Dr. Hunter, were sent into the eastern districts, to observe the progress of the disease and the sanitary circumstances of the sufferers, or to confer with local authorities on measures of prevention and treatment; and also, at the request of the Lords of the Council, Mr. Secretary Walpole gave the department the advantage of the advice of Mr. Rawlinson and Mr. Arnold Taylor, of the Local Government Act Office, as to the state of the works of the East London Water Company. Dr. Buchanan further visited the unions of Greenwich, Deptford and Woolwich, the town of Holyhead, including the Irish Mail Steamers establishment in that place, the village of Pill, near Bristol, and, for a second time, Liverpool: in addition to which, Neston was visited by Dr. Hunter, Carnarvon by Dr. Seaton, and Southampton, as in 1865, by Professor Parkes. In my Appendix are contained all the more important reports which reached me in

relation to the above cases, including Mr. Radcliffe's report on the very elaborate research which he has made into the facts and circumstances of the great East London epidemic.

One sort of proceeding which my Lords took in relation to cholera during the year remains yet to be mentioned. I had submitted to their Lordships that many pathological and medical questions, as to the nature and habits of the disease, and the principles on which it ought to be treated, were still matters of scientific uncertainty; and that, in my opinion, it was very greatly to be desired, in the interests of mankind, that, during the presence of the disease among us, methodical attempts should be made, by the researches and observations of skilled persons, to narrow, if possible, the limits of those large uncertainties. My Lords were pleased to accept this view, and afterwards to sanction a scheme, which at their desire I had submitted to them, for the organization of some such work under their auspices.

Scientific in-  
vestigations of  
cholera.

The proposed branches of inquiry were as follows:—1) examination of the degrees of success attained by different methods of *treatment* of cholera, especially as practised in the London hospitals; 2) study of the successive *chemical changes* undergone by the body in cholera, and of the relations subsisting between those changes and the symptoms which the patient presents during life; 3) similar study, chiefly microscopical, of the successive *anatomical changes* of the affected body; 4) verification of alleged experimental proofs of the *communicability of cholera*; 5) collection of facts, in the line of study opened by Professor v. Pettenkofer, of Munich, as to the non-coincidence of local epidemics of cholera with such conditions of the local ground-water as are indicated by a full state of surface-wells. For the first of these objects, four physicians of leading metropolitan hospitals—Dr. Wilks of Guy's, Dr. Martin of St. Bartholomew's, Dr. Hughlings Jackson of the London, and Dr. Bristowe of St. Thomas's, consented to act together as a committee of investigation for the Privy Council; and it was intended that, if the epidemic extended westward in the metropolis, other representative physicians should be added to their number. The second

Scientific investigations of cholera.

object was referred to Dr. Thudichum, as a development of the work on which he was already engaged for the department. The third, from unavoidable circumstances, remained in abeyance. The fourth was undertaken by Dr. Sanderson. And the fifth (likely in part to join on to meteorological studies) was put into the hands of Mr. Glaisher, of the Royal Observatory, Greenwich.

The results of these several studies are in part given in my Appendix, but in other part are still incomplete. Happily for our endangered population, opportunities for scientific investigation of the disease neither became so general in London, nor continued for so long a time, as to enable any great programme to be fulfilled.

Towards the end of the year, Dr. Wilks, on the part of the Treatment Committee, informed me that the information before the committee was not enough to form the basis of a satisfactory report; and under these circumstances I conveyed to him their Lordships' request that the committee—since the epidemic as yet might perhaps be only suspended—would continue in function till the end of the present year. At the same time, as it seemed important to have some testimony to the quality of this epidemic (so far as yet seen) in relation to medical practice, I had their Lordships' authority to request from Dr. Sutton, who had been in charge of Miss Sellon's temporary East London Cholera Hospital, a report on the medical experiences of that most serviceable charity; and I now subjoin [A] the report which Dr. Sutton has in consequence written. In this context, too, I may permit myself the pleasure of referring to various interesting papers in relation to the East London epidemic which are contained as an appendix in the recent (third) volume of "Clinical Lectures" and Reports by the Medical and Surgical Staff of the London Hospital, and which probably represent, as well as if they had been contributed from a wider area, the latest relations of cholera to medical treatment. Among them, in this point of view, I would particularly refer to the account which Mr. Little gives of a few cases where he tried with much thoroughness the practice of injecting, and, in case of need, re-injecting, saline fluid into the blood of persons in collapse.

The chemical investigation of cholera was pursued most laboriously by Dr. Thudichum at St. Thomas's Hospital; and I subjoin [A] the report which he has made of the very interesting results hitherto obtained by him in that study.

Scientific investigations of cholera.

That our last year's arrangements for investigation could not include the anatomy, and especially the microscopy, of the body in cholera, was matter for much regret;\* the more so, as that line of study in Germany has led some of our fellow-labourers there to new and striking observations, which, under more favourable circumstances, if they had not been simultaneously made here, might at least have been verified and perhaps extended. For it is again alleged, and now as the discovery (or rather re-discovery†) of two independent German observers, Ph. Dr. Thomé of Cologne, and Professor Klob of Vienna, that the stomach and intestines of cholera patients contain within them microscopical fungic bodies, innumerable and vehemently multiplying, whereof swarms are shed, with prolific and infective power, in each characteristic evacuation of the sick.‡

The fourth branch of the inquiry was conducted by Dr. Sanderson to a satisfactory conclusion; and I subjoin [A] his report on the subject.

The fifth, under the most favourable circumstances, could not have been illustrated more than in small part during the year; but Mr. Glaisher had opened communications on the

\* I am glad, however, to notice that some independent study of the affected mucous membrane was made by Dr. Beale, with his eminently skilful use of the microscope, and that the results of this work have since been published by him as contributions in the Medical Times and Gazette.—J.S.

† See section 5 of Boehm's classical work "die kranke Schleimhaut in der Asiat. Cholera," Berlin, 1838.—J.S.

‡ Dr. Thomé's observations are contained in a paper, published (with date of "end of November 1866") in Virchow's Archiv, for last February. Dr. Klob's, dated "December, 1866," are published as a pamphlet with the title "Pathologisch-anatomische Studien über das Wesen des Cholera-processes." Professor Parkes gives me the interesting information that he recognizes in the descriptions and plates of these writers the "corpuscles" or "granules" which attracted much of his attention in 1849, and are often spoken of by him (with no suspicion of their being of vegetable nature) in this paper, then published in the London Journal of Medicine, "on the intestinal discharges in Cholera;" also that he had noticed these bodies again in 1865 and 1866, when they vividly recalled the former observations to his mind; and that he noticed like bodies once in the sediment of a first cholera urine.—J.S.



Scientific investigations of cholera.

subject with observers in many different parts of the country, and I hoped to have in my Appendix a report from him on some first instalments of evidence. Unfortunately, however, about the time when he might have been reviewing his materials for such a report, serious illness (from which he is even yet not fully recovered) obliged him to suspend the inquiry.

In connexion with my account of the scientific proceedings of the department in relation to cholera, I should be glad if the time had come for stating, with any pretensions to finality, the corroborations or modifications of doctrine which, doubtless, will have to be recorded when this fourth great visitation of the disease shall have run its fatal, but most instructive course. To write now in any such sense would be premature. The studies of the disease, so far as they have gone, promise, I think, to result in considerable augmentations of knowledge; but hitherto, in my opinion, they are not so far advanced, either in this country or abroad, that I need discuss their probable bearing on previous doctrine. Instead of doing so I attach a few critical remarks to some of the papers in my Appendix. And perhaps, if circumstances should justify any further statement in questions which are now open, I may be permitted to add a postscript to this report.

Action of local authorities.

It is neither in my province nor in my power to submit any particular statement of the action taken by local authorities throughout the country in execution of the Diseases Prevention Act and of the regulations thereunder issued. It is not the practice for any local authority, except on special application, to report its action to the Privy Council; but in cases of inaction, communications are apt to be made by persons who feel themselves aggrieved; and, when I look to the comparatively small number of complaints of inaction which were made after the Order in Council, as well as to some more positive evidence in the matter, I think it may perhaps be assumed that generally the action of local authorities satisfied their constituents, and accorded in great part with the spirit (if not so much with the letter) of their

Lordships' regulations.\* If I may judge from the experience of London, voluntary action of all kinds was, as usual, ready to aid the authorities.† And as no place in England suffered more heavily than the Eastern districts of the metropolis, I may particularly refer to the very valuable services which were here rendered by the London Hospital, always among our foremost charities, and by Miss Sellon's temporary hospital in Whitechapel. Grateful acknowledgments are also due to the Seamen's Hospital Society, which from the middle of August voluntarily undertook the daily medical visitation of all ships in the metropolitan portion of the port of London, distributing medicines as required, and removing to the cholera ship "Belle-Isle," the cases which needed hospital treatment.

Action of local authorities.

I have nothing of medical importance to state with reference to proceedings taken here against cholera under the Quarantine Act. Indeed in my last report I showed the impossibility of fulfilling for England the conditions of a successful quarantine against cholera. But as I also then admitted "that quarantine, conducted with extreme rigour

Quarantine against cholera.

\* The largest exceptions to the rule were probably in regard of the regulation which provides for systematic house-to-house visitation in suffering districts, and of the regulation which enjoins the speediest possible interment of the dead. No doubt these two regulations are the most difficult of all to carry into effect; but the Diseases Prevention Act expressly provides for their being made. It is, in my opinion, desirable that local authorities should take pains to ascertain for themselves how very much real help and comfort is withheld from suffering districts when effective and systematic house-to-house visitation is not established; and also that they should better appreciate how very much alarm and horror are excited in epidemic times by any prolonged retention of dead bodies. Two or three cases of flagrant neglect of the regulation as to burials were reported to the department within a few days after the issuing of their Lordships' regulations; but in extenuation it must be admitted that local authorities, at that time, might not fully have completed their arrangements for speedy burial.—J.S.

† During August and September numerous applications were made by local authorities to the War Office for the loan of hospital-tents and ambulances for the use of persons suffering from cholera. As "the Sanitary Act, 1866," which was passed on August 7th, gives power to metropolitan boards and vestries, and in the country to sewer authorities, to provide temporary hospitals, these applications were not indiscriminately entertained; but whenever exceptional circumstances existed (such as those of some places during hop-picking) the War Office, upon their Lordships' recommendation, granted the required accommodation, subject to the price or hire of the tents and ambulances being paid.—J.S.

Quarantine  
against cholera.

"and with the precision of a chemical experiment, will keep cholera out of any part of Europe in which the extremely difficult conditions can be absolutely fulfilled," so it may be convenient that I now place on record two cases, brought under my notice during the year, where quarantine seems to have been effectual. A despatch to the Foreign Office, from Her Majesty's Minister at Florence, dated October 26th, 1866, gives the following statement. "The outbreak of cholera at Palermo has taken place under circumstances which merit some remark. Last year cholera prevailed at Naples Malta, Marseilles, and other places with which the intercourse with Sicily is most frequent; but a quarantine of the most stringent, not to say exaggerated form, was enforced throughout the island, and the disease never appeared there. The same thing occurred again this summer, and notwithstanding the prevalence of cholera at Marseilles, Genoa, and Naples, it did not make its appearance in Sicily, where the quarantine was, as before, rigidly enforced. Then came the disturbances at Palermo, and the necessity of bringing troops at once from Naples, and of landing them without delay. In a few days it begun to be whispered that cases of cholera had occurred amongst them and, shortly afterwards, some of the towns-people were attacked; till, by the last returns, above a hundred deaths had taken place within the twenty-four hours." The following facts are taken from a despatch addressed on 23rd April 1866 by the Lieutenant-Governor of Dominica to the officer administering the Government of the Leeward Islands; a copy of which was received by my Lords from the Colonial Office. A brig left Marseilles in the autumn of 1865, bound for the French island of Guadeloupe, and while she was on her voyage a boy on board died of cholera; the captain kept some of the boy's clothes, and on arriving at Pointe-a-Pitre in Guadeloupe sent them to be washed. The laundress was attacked with cholera; other cases quickly followed; and soon the disease spread throughout the island. Up to February 19th, 1866, out of a total population of 138,669, there had been 10,808 deaths from cholera registered, including no fewer than 1,934 in Basse-terre, the capital, which

Quarantine  
against cholera.

has but a population of 9,576; and the commander of a French ship of war which called at Dominica about the end of March informed the Lieutenant-Governor that, by that time, about one-third of the population of the capital, and about a ninth-part of the whole population of the island, had perished from cholera. Such was the magnitude of the danger which threatened the neighbouring island of Dominica, and which was, if possible, to be averted. Dominica is 22 miles from the main island of Guadeloupe, but only 15 from some of its dependencies, certain small islands called "Marie Galante," above-mentioned, and "les Saintes." Up to the beginning of November 1865, the communications between these small islands and the north end of Dominica was constant, almost daily; the markets of Marie Galante were supplied with provisions and vegetables from Dominica; and carpenters, bricklayers, and others living in Dominica, went across the narrow channel to work at Marie Galante, leaving their wives and families at home. It was on the 2nd of November that a rumour reached Dominica that cholera had broken out at Pointe-a-Pitre in Guadeloupe. On the 4th the Lieutenant-Governor of Dominica sent to the Governor of Guadeloupe for information; and feeling persuaded, after the return of the messenger, that it really was an outbreak of cholera, he on the 9th declared Pointe-a-Pitre in quarantine. Afterwards, when news arrived that the disease was spreading through the island of Guadeloupe, the whole of the island and its dependencies were placed in quarantine. Despite this precaution, a boat from Marie Galante filled with persons, some still healthy and some sick with cholera, succeeded in reaching Dominica. A street-guard was placed by the Lieutenant-Governor on the village at which these persons had landed, and for the future, "health-guards" with loaded muskets were stationed at every place round the island where landing was possible, to prevent persons from Guadeloupe from setting foot on the island. These measures of precaution were entirely successful, and, so far as I can gather from the despatch, only two persons died of cholera in Dominica; and these were two boat-

men who landed from the boat mentioned above, and died on the beach, close to the village which was subsequently isolated.

#### THE SANITARY ACT, 1866.

The Sanitary Act, 1866.

In the year 1866 an event occurred of greatly more importance to the public health than any of these departmental proceedings which have claimed first mention in this annual report. The Legislature, namely, on the motion of my Lords, and with particular reference to defects which it had been my duty to report, took into consideration the state of the sanitary law of the country, and saw fit to amend and enlarge the law by enactments of such stringency and comprehensiveness that the date of this change—the passing of the Sanitary Act, 1866, marks the beginning of a new era in the progress of sanitary reform. Fully to set forth the immense public gain which this recent legislation represents, I should have to comment on each separate section of the Act with more detail than would here be admissible; and I can only venture to advert in a few words to some of the most important of the new enactments. Such are the following:—§ 11, which provides universally for supply of water; § 19, which enlarges in several directions and with singular advantage the previous legal definition of “nuisance;” § 20, which renders it obligatory (no longer optional) for local authorities to make inspection of their districts, and, where nuisances exist, to suppress them; §§ 22–30 and 37–39, directed against various kinds of personal conduct, and various deficiencies of accommodation, which lead to the spread of contagious disease; § 35, which gives to town-authorities the invaluable power of regulating the so-called tenement-houses of the poor; not least, § 49, which creates a power of appeal to central government from the inaction of local authorities, and provides that, where sewers are not duly provided, or water not duly supplied, or nuisances not duly removed, there, in the last resort, the central government and the Court of Queen’s Bench can enforce the neglected local duty. And how vastly the sphere

of usefulness of local authorities is widened by the altered definition of “Nuisance” will be evident when it is observed, first, that overcrowding (certainly among the foremost sanitary evils of the country) now for the first time falls technically within that definition; and, secondly, that, under another extension of the term, the industrial millions of the country get the great boon of having all factories, workshops, and workplaces not yet under special Acts, made subject to the sanitary supervision of local authorities; and this not only in respect of uncleanness and overcrowding, but in respect also of the often very fatal agency of “gases, vapours, dust, or other impurities generated in the course of the work.” The Act, having passed only on August 7th, could not be used with much effect in relation to last year’s special emergencies: its value of course was chiefly prospective; converting a law which was grievously defective into one which contains nearly all requisite provisions for the public health. For detailed evidence as to the amount of good which may be realised under the new law, I may best refer to the statements contained in my past annual reports, especially in the last five of them: on the one hand, as to the preventable diseases of the country, and the spreadings of contagious disease; on the other hand as to the influences which have been operating against human life, in the non-administration and insufficiency of the nuisance law, in the wretched house-accommodation of the poor, and, not least, in the sanitary circumstances of industry. The broad effect of this most beneficent legislation may, I believe, be summed up in this simple fact, that influences which have hitherto been causing about a quarter of our total mortality are now for the most part brought within control of the law.

It has seemed to me however, which I think it my duty to mention, that one important exception to this satisfactory state of the law was brought to light in connexion with last year’s outbreak of cholera in London. I refer to the relations subsisting, and particularly in one respect, between commercial water companies and the public. It will be seen in Mr. Radcliffe’s report that the East London Water

The Sanitary Act, 1866.

Water companies in relation to the public health.



Water companies in relation to the public health.

Company, through its engineer, acknowledges to having acted in contravention of the fourth section of the Metropolis Water Act, 1852, by distributing for public use a water (and a most improper water) which had not passed through its filter-beds; and Mr. Radcliffe adduces very strong evidence to show that the East London outbreak of cholera was occasioned by this illegal and most culpable act. It seems to me that the public is hitherto very imperfectly protected against certain extreme dangers which the mal-feasance of a water-company, supplying perhaps half a million of customers, may suddenly bring upon great masses of population. Its colossal power of life and death is something for which till recently there has been no precedent in the history of the world; and such a power, in whatever hands it is vested, ought most sedulously to be guarded against abuse.

I venture to submit that the penalty of 200*l.* which the Metropolis Water Act imposes for a violation of its provisions is utterly incommensurate with the magnitude of the public danger which a lax administration of the law represents; and it is certain that in 1852, when this statute was enacted, the state of science did not yet enable the Legislature to know, as it must now know, that a water company distributing sewage-tainted water may, in a day, take hundreds of lives. In theory, no doubt, it would appear that Lord Campbell's Act (9th and 10th Vict., cap. 93) must apply to cases of this description—that actions for damages are maintainable against water-companies by the families of persons whom any wrongful act, neglect, or default of such companies has thus killed; and of course, that the person himself, if injured but not killed, can have his own action for damages. But the difficulties in taking any such course at law would, I believe, be extreme. The proof generally as to the epidemic might be complete; it might be shown to the satisfaction of a jury that the outbreak, in mass, had been caused by the distribution of a certain water, which some commercial company, with ignorant or profligate laxity, had suffered to be polluted with sewage; but, with all this clearly shown as to the epidemic generally, it might still be scarcely possible for any individual victim of the

company's mal-feasance to prove (if this had to be proven) that his particular attack came from the direct operation of that and no other cause. It is probably from a perception of this difficulty that, so far as I know, no proceedings for damages have ever yet been taken against a water-company by persons whom the water has injured. And as the deterrent influence of such personal proceedings does not operate in aid of the general law, it is, I submit, especially to be desired that any wilful or neglectful distribution of polluted water to the public should be punishable under the statute law in a very much higher degree than at present.—March 31st, 1867.

Water companies in relation to the public health.

#### POSTSCRIPT.

August 3rd, 1867.—Since my above report was presented, and while it and its appendix have been printing, I have had the great advantage of comparing notes on the subject of cholera with the foremost of my fellow-workers on the Continent. Four leading epidemiologists of Germany—Professors Griesinger and Hirsch of Berlin, Wunderlich of Leipzig, and v. Pettenkofer of Munich, had proposed that an international medical conference should be held at Easter at Weimar; where persons who officially or otherwise had been much busied with the study of cholera in their respective countries might meet, from different parts of Europe, to exchange information as to past experiences of the disease, and to consult together, in the interests of the public health, both as to the best principles of defence against cholera, and also as to those prospective scientific investigations by which the knowledge of right principles might be advanced. The distinguished conveners of this meeting honored me with an invitation to attend; and my Lords, rating very highly the benefits which such conferences may give, authorized me to accept the invitation. This accordingly I did, and had the pleasure of spending several days, according to the programme, in interchanging experiences and suggestions with men whom it was an official advantage to me to consult.

Cholera Conference at Weimar.

Cholera Conference at Weimar.

Germany and England may between them claim the credit of having built up nearly all the definite knowledge which is yet possessed as to the pathology of our great modern pestilence. Each of the two countries has worked, of course, with some distinctive peculiarities of its own; and the time has now come when a thorough interfusion of the two respective stores of attainment is necessary for the progress of either country, and, therein, for the common good of mankind. I may venture to say that those whom I met at Weimar welcomed the opportunity which my presence afforded them of learning more familiarly than before the very important sanitary experiences of England, including those (not the least important of the number) which are recorded in this volume in Dr. Buchanan's and Mr. Radcliffe's reports; and on the other hand I can most strongly testify that the conference had before it, from continental and chiefly German observers, facts upon facts, of high importance and impressiveness, as to those parts of the great subject-matter which have hitherto been least cultivated in England.

As the full reports of the proceedings of the conference will shortly be published, I need not attempt any circumstantial account of the communications to which I refer, but may very briefly describe their general bearing.

Local relations of cholera to soil and its variations of state.

First and especially, the doctrine for which Pettenkofer has long contended, that the "caprices" of cholera, as to its places and times of prevalence, have their respective roots in different qualities and different states of local soil, was illustrated by many examples. One such, as to places, was a geological map of Thuringia, with the epidemics of 1866 marked upon it; where at a glance it was seen that the epidemics in that large and varied area had been almost exclusively on one geological formation. And equally striking in the same sense were some illustrations on a smaller scale (as from Bautzen, Zwickau, Altenburg, Apolda, Würzburg, and other places) showing extremely definite boundaries of non-prevalence or minor prevalence of cholera, coincident with equally abrupt distinctions of local soil. Similarly as to the "time-caprices" of the disease, facts of considerable interest were adduced (especially from St.

Petersburg, Lübeck, and Pesth) in support of Pettenkofer's view, that the different behaviour of cholera at different times in the same place is determined by temporary differences of soil: *i.e.*, by variations, in different seasons, in the thickness of superficial porous soil which is left unoccupied by "ground-water," and consequently penetrable by air: variations which in many cases can be inferred from the varying water-level of surface-wells.

Local relations of cholera to soil and its variations of state.

A next very striking set of reports related to some supposed successes, and some unquestionable non-successes, of chemical disinfection, where it had been used in the hope of preventing or arresting epidemics of cholera. I had had the pleasure of laying before the conference the very remarkable account, which Dr. William Budd of Bristol had recently published,\* of the almost entire exemption of that place from cholera in 1866, under a system of disinfection which the medical officer, Mr. David Davies, to his great credit, had applied with singular assiduity and completeness. This case, taken by itself, had certainly a very hopeful complexion; but nothing could be more disheartening than some counterstatements which were made; and after them the only hope I could retain in the matter was that perhaps the good to be got from disinfection in favourable cases was not quite fully represented by the failures of Leipzig, Stettin, Erfurt, and other places in Germany. In Leipzig Professor Victor Carus, as a volunteer for his town, had been all that Mr. Davies was in Bristol; the town was divided into 100 disinfection districts, each with an officer who visited daily for disinfection with sulphate of iron every house in his district; over these district officers were four young chemists, constantly inspecting under Dr. Carus's instructions to see that all disinfection was satisfactory; and Professor Carus himself, besides superintending all this work, personally every day visited all houses which had cholera in them: disinfection had never before been tried in Leipzig, yet never had Leipzig suffered so severely from cholera. In Stettin all choleraic discharges were treated with lime and chloride of lime; but, in all the

Disinfection against cholera.

\* British Medical Journal, April 13th, 1867.—J.S.

13 cholera epidemics of the town, never had the disease been so severe. In Erfurt carbolic acid was used so lavishly that the very drinking-water reeked and tasted of it; testifying by-the-bye to a poisonous proximity of wells to cesspools; but cholera was three times more fatal there than it had ever been.

The "cholera fungus."

A third great centre of interest consisted in communications as to the so-called cholera fungus. Both Dr. Thomé and Professor Klob were present; and two of the leading mycologists of Germany, Professors Hallier of Jena and De Bary of Halle, were associated with these gentlemen as a committee, to make in common with them a statement and appreciation of the facts which had been observed. The report, drawn by Professor De Bary, was, in substance, this: "Both observers find in cholera evacuations and in the "intestinal mucus of the dead body definite organic structures, zoo-gloea, consisting of excessively fine granules, "clustered more or less densely in the interspaces of a jelly, "which more or less abundantly surrounds them. The "granules divide and sub-divide themselves, to form beaded "threads, which interlace in immense numbers into felted "masses in the mucus. The further development of these "organisms has yet to be determined. Dr. Thomé, by sowing them, has got after some time larger round cell-like "bodies, which rapidly multiplied, and also abundant filamentous fungi (*cyindro-tanium*) on which grew cylindrical spores, capable of developing again to filaments. "Views as to the mutual relations of these cells, filaments "and spores, are for various reasons to be expressed only "with reserve, and the study of them is so immensely "difficult, that definite results cannot at once be expected. "The significance of these fungi would be greatly increased "if they should be shown to exist in the blood as well as "in the bowels of the sick: but this, though from some "inquiries it seems probable, must at present be deemed "questionable." To this quotation I may add that I have more recently been favoured with a letter from Professor Hallier (date June 18th) informing me that he has now himself succeeded in finding a fructifying fungus in choleraic discharges; and that by 44 different experimental cultiva-

tions he has made himself cognisant of all its forms. He mentions that it requires a high temperature (R. 25°-35°) for its fructification, and therefore cannot be of European origin.\*

With the present opportunity of adding a few supplementary remarks to my report, and particularly with the results of the Weimar conference before me, I am led to consider once more whether the additions, which our previous knowledge of cholera has hitherto during this epidemic received, are such as to change in any respect the principles on which I have heretofore advised against cholera, or in any way to require that I should make other practical recommendations than those which were last year issued from this department, and are now subjoined in my Appendix. After giving to this question the best consideration in my power, I answer it, though with very mixed feelings, confidently in the negative.

Present practical knowledge of cholera.

Doubtless it is lamentable that one should still have to speak almost with despair of the medical treatment of developed cholera. But so it is. The task continues to be, as from our first acquaintance with the disease it has been, an almost hopeless task for the practitioner. The experience of renewed epidemics, the studies of 35 years, have in this respect done little more than warn us from various kinds of hurtful activity, and teach us that at present our utmost power is but perhaps some very little ability of palliation.† In the treatment of incipient cholera, there might certainly

Medical treatment of cholera.

\* As this Report is on the point of being printed off (August 3rd) I receive Professor Hallier's finished monograph on the fungus, and shall subjoin a brief abstract of this most interesting paper. See App., pp. 321-5.—J.S.

† If among recent publications there be hinted some partial exception to the otherwise universal helplessness of medicine in cases of choleraic collapse, the exception neither in kind nor in degree is such that the ravages of the disease, in relation to masses of population, are likely ever to be much affected by it. In saying this I refer particularly to the method of saline aqueous transfusion. Not only are competent dexterity and experience wanted for this palliative treatment of collapse to have any fair chances of success, but also (with a view to immediate renewed transfusion when required) the patient has to be incessantly watched with a minute vigilance which cannot possibly be got where large numbers are concerned. See Mr. Little's paper on the subject in vol. 3 of the London Hospital Reports.—J.S.



Medical treatment of cholera.

seem more room for hope; but competent physicians are not agreed that even here their art has much true efficiency against the disease. Practically then, more and more, as facts like the above become notorious, the business of resisting cholera on any large scale resolves itself into aims of prevention. And in contrast with the powerlessness of curative medicine, the preventive power which we possess is among the happiest possessions of science.

Prevention of cholera.

Yet here, as in the former respect, though for reasons which are widely different, I have again nothing new to advise. That which for public use in this country I believe to be, without any shadow of doubt, now as for long past years, the all-important principle of cholera-prevention: the principle that, for us, cholera derives all its epidemic destructiveness from filth, and specially from excremental uncleanness: this of course may be iterated and re-iterated, with new and newer illustrations, but the utmost prominence which I can give to it was given in my last year's memorandum, and new knowledge neither permits me to express myself less strongly on the subject, nor enables me to express myself more strongly, than I have done even years and years ago.

The doctrine of the cholera-fungus—the alleged discovery that the specific zymosis of cholera, the bowel-fermentation in respect of which it is contagious, has essentially associated with it, and perhaps as its immediate cause, a definite multiplying organic form, is not only of the utmost philosophical interest, but, should it be substantiated, may also hereafter be found capable of very important practical application. For as one reflects on the doctrine in all its bearings, specially as one considers Professor Hallier's conjecture (based on botanical considerations) that perhaps the cylindrotæmium is originally a blight of rice,\* something like a clue is for the first time suggested for investigations which may hereafter conduce to the prevention of cholera in its eastern centres of origination. But for us in Europe,

\* This impressive hint is contained in a little notice which Prof. Hallier gives of his culture-experiments in No. 30 (1867) of the Berlin Centralblatt. See also App., pp. 321-5.—J.S.

meanwhile, the doctrine may be absolutely sterile of results. In its broad signification, indeed, the discovery would not be a surprise to pathologists. The possibility has for some years past been recognized that perhaps every fermentatory or putrefactive change of organic material has with it, and may be as its cause, a characteristic molecular living thing;\* and, however sure it may have become that the choleraic zymosis answers to that possibility, it remains yet untried whether disinfection (which after all is but a doubtful resource) can deal better with the process on that basis than on the purely chemical basis which has hitherto been the ground of our proceedings.

In the long chain of cause and effect through which the rise of a certain ferment in India becomes the predestining force for subsequent outbreaks of pestilence in Europe, we see at present only one link where we may strike with the certainty of preventive effect. Whatever may be the explanation of the fact, at least empirically we know that here in Europe the pestilence rages only where there are definite sanitary evils. This knowledge remains unchanged; and unchanged remain also our practical means of applying it. Between different epidemiologists there may be differences, even strong differences, of opinion, as to the intimate nature of some of the steps by which the Asiatic influence becomes able to operate on the individual dweller in some English town; but practically all would unite in saying that the chain of evil is abruptly broken wherever thorough cleanliness prevails. The details of the contrary condition are beyond measure disgusting to write about; but more disgusting by far it would be that they should continue through not being identified. It cannot be too distinctly understood that the person who contracts cholera in this country is *ipso facto* demonstrated with almost absolute certainty to have been exposed to excremental pollution; that what gave him cholera was (mediately or immediately) cholera-contagium

Prevention of cholera.

Relation of cholera in England to faults of drainage and water-supply.

\* See in Sixth Annual Report, pp. 151-2, foot note on the experiments of Schröder and Pasteur, as to the connexion generally of fermentatory and putrefactive changes with the presence of characteristic organisms, and on the interest of these experiments to zymotic pathology.—J.S.

Relation of  
cholera in  
England to  
faults of  
drainage and  
water-supply.

discharged from another's bowels; that, in short, the diffusion of cholera among us depends entirely upon the numberless filthy facilities which are let exist, and specially in our larger towns, for the fouling of earth and air and water, and thus secondarily for the infection of man, with whatever contagium may be contained in the miscellaneous outflowings of the population. Excrement-sodden earth, excrement-reeking air, excrement-tainted water, these are for us the causes of cholera. That they respectively act only in so far as the excrement is cholera-excrement, and that cholera-excrement again only acts in so far as it contains certain microscopical fungi, may be the truest of all true propositions; but whatever be their abstract truth, their separate application is impossible. Nowhere out of Laputa could there be serious thought of differentiating excremental performances into groups of diarrhoeal and healthy, or of using the highest powers of the microscope to identify the cylindro-tæmium for extermination. It is excrement, indiscriminately, which must be kept from fouling us with its decay.

Prevention of  
cholera by  
proper sanitary  
constructions.

And thus it is that my practical advice remains substantially what it has been for years. The local conditions of safety are, above all, these two:—(1) that, by appropriate structural works, all the excremental produce of the population shall be so promptly and so thoroughly removed, that the inhabited place, in its air and soil, shall be absolutely without faecal impurities; and (2) that the water-supply of the population shall be derived from such sources, and conveyed in such channels, that its contamination by excrement is impossible.

What good results are got even by rough approximation to those sanitary standards has already been abundantly shown here. The way in which the southern districts of London, with their three-fourths of a million of population, have gradually gained comparative immunity from cholera in proportion as their two water-companies have ceased to distribute sewage-tainted water among them, is matter of familiar history. And the results to which I have already referred, as found by Dr. Buchanan in various towns where works of drainage and water-supply have been provided—results which

may be read at a glance in column E. of the table [pp. 273–4] are further illustrations to the same effect.

That cholera is still a terror to Europe shows how scantily such illustrations are yet understood. Even here in England the objects which I have named as essential are at best but rarely fulfilled; indeed for vast numbers of our population scarcely rudimentary endeavours have been made to attain them. Town after town might be named, with myriad on myriad of population, where there is little more structural arrangement for the removal of refuse than if the inhabitants were but tented there for a night. The case of the water-supply is no better: my reports are incessantly showing the too frequent foulness of private supplies; while, as regards public water-supplies, such as generally are in the hands of commercial companies, it has again and again been shown (and seldom more pointedly than in the present volume) that their conveniences and advantages are countervailed by dangers to life on a scale of gigantic magnitude, unless those who administer the supplies act under a very deep sense of responsibility.

Cholera, ravaging here at long intervals, is not Nature's only retribution for our neglect in such matters as are in question. Typhoid fever and much endemic diarrhoea are, as I have often reported, incessant witnesses to the same deleterious influence; typhoid fever which annually kills some 15,000 to 20,000 of our population, and diarrhoea which kills many thousands besides. The mere quantity of this wasted life is something horrible to contemplate, and the mode in which the waste is caused is surely nothing less than shameful. It is to be hoped that, as the education of the country advances, this sort of thing will come to an end; that so much preventable death will not always be accepted as a fate; that, for a population to be thus poisoned by its own excrement, will some day be deemed ignominious and intolerable.

Typhoid fever  
and much  
diarrhoea  
governed by  
same influ-  
ences.

## APPENDICES.

DIRECTIONS and REGULATIONS issued in 1866, in relation to ASIATIC CHOLERA, by the LORDS of the COUNCIL, acting under the DISEASES PREVENTION ACT, and OFFICIAL MEMORANDA circulated in connection therewith.

a. DIRECTIONS and REGULATIONS of July 20th, 1866, for Places not within the Metropolis.

## I.—Preliminary.

Preliminary arrangements.

Forthwith on the issuing of the present regulations, the Clerk of every Board of Guardians shall summon a special meeting of the Board, in order that the present regulations may be brought before them, and that the Board may make (as they are hereby required to do) such preliminary arrangements as will enable them, if sudden need shall arise, to carry the following regulations into immediate effect; and the Board at such meeting shall direct the Clerk, by instructions to the Medical Officers, and by circular letters of request addressed to all legally qualified Medical Practitioners in the union or parish, and in such other ways as the Board may think necessary, to take measures for causing the Board to be made acquainted with any presence of Cholera or unusual amount or severity of Diarrhœa in the union or parish, or any part of it, if such be existing or should thereafter exist; and the Board, if apprised of any such presence of Cholera or Diarrhœa, shall thereupon forthwith, so far as the circumstances require, do the several things herein-after ordered:

## II.—When Cholera is in an Union or Parish.

Meetings of the local authority.

1. Every Board shall make arrangements for meeting, in districts where the disease is actually prevailing, daily, either in a body or in one or more committees, according to the exigencies of the district, for the purpose of exercising the powers conferred upon them by the Act.

Place of meeting.

2. The meetings may be held at the ordinary Board-room, and, where necessary, at such other places as shall appear to be most convenient for dealing with the disease, and the Board shall cause proper minutes of all proceedings to be made and duly recorded.

Appointment of Medical Adviser.

3. Where the Union or Parish forms part of any town of more than 60,000 inhabitants, or contains a town of more than 40,000 inhabitants, according to the report upon the last Census, or where several parts of the Union or Parish are at one time suffering from Cholera, the Board shall appoint some legally qualified Medical Practitioner, to attend at the meetings and render his advice thereat, and superintend all the medical arrangements for preventing and treating the disease.

Appointment of Medical Visitors.

4. In each district in which Cholera is present, or, if the quantity of work to be done renders it desirable to subdivide the district, then in each of such subdivisions a legally qualified Medical Practitioner shall be put in charge of the district or subdivision for the medical purposes of these regulations; and to each such Medical Practitioner shall be allotted all needful Medical Assistants and such other Assistants as the Board see fit.

Such District Medical Practitioner, or one of his Assistants, shall at least once daily visit those parts of the district which are inhabited by the poorer classes and wherein the disease is, and shall there inquire at every house as to the existence

of Diarrhœa or Cholera, and shall enter in a book to be kept for the purpose the facts as to all cases he may meet with, and shall without delay give, or take the proper steps for causing to be given, all necessary medical assistance to the sick. And the Medical Practitioner or Assistant shall, when visiting the part assigned to him, be provided with medicines for immediate administration in urgent cases, and shall be held to be in medical charge of all cases of Diarrhœa or Cholera with which he may meet until he is relieved by such other provision for their medical attendance as may be made or sanctioned by the Board.

5. Such Medical Practitioner shall, by transmitting his above-required book, or otherwise, report daily to the Board of Guardians, or to the Committee of the district for which he acts, the result of his own and his Assistants' inquiries, and shall make such suggestions as to the state of the district as he shall deem advisable. Their report.

6. In places where the Board of Guardians are not the Nuisance Removal Authority, the Board shall, without delay, cause report to be made to such authority, and, if the Board see fit, shall complain to the Justices, of every case where any Committee, Medical Practitioner, or Assistant, employed by the Board, shall find any nuisance injurious to health existing in any premises visited by them. Board to report nuisances.

7. The visitors shall, where they find it expedient, communicate to the Relieving Officer of the district any case of destitution requiring relief, which is not entered in his relief list, and such officer shall forthwith visit the same and give such relief as in his judgment the case shall require. Visitors to report cases of destitution to the Relieving Officer.

8. The Board shall provide a sufficient number of dispensaries, to be open night and day, at convenient places within their district, with an adequate supply of such medicines, medical appliances, and disinfectants, as their Medical Adviser shall recommend, and with a legally qualified Medical Practitioner or skilled Assistant always in attendance at each; and such medicines, medical appliances, and disinfectants, shall be dispensed without charge by such Medical Practitioner or Assistant to persons bringing orders for the same from the District Medical Practitioners, and to other persons who apply for immediate medical treatment. And the names and addresses of all such applicants shall be sent to the District Medical Practitioner of the place in which they reside. Board to provide dispensary stations.

9. In every case of Cholera or Diarrhœa, where the patient is not under medical care and treatment, the Board shall cause medical assistance to be rendered with the utmost expedition, and such aid, and comfort, nourishment, and accommodation, as the circumstances of the case will admit, with the object of restoring health. Board to supply medical aid to poor Cholera Patients.

10. The Board shall provide competent nurses to aid every District Medical Practitioner in his attendance upon the patients suffering from the disease. To provide nurses.

11. When the Medical Adviser recommends, the Board shall, with as much despatch as practicable, provide fit and proper accommodation for the reception of such patients as have no home, or cannot properly be treated at home, and may with advantage to themselves be removed, and shall cause the same to be provided with all appliances, medicines, furniture, and other things necessary for the emergency, and shall appoint a legally qualified Medical Practitioner, with or without Assistant, as the case may require, to attend to the same. To provide hospitals in certain cases.

12. If Cholera or Choleraic Diarrhœa exist in any dwelling whereof the Medical Practitioner reports that the sick and healthy cannot therein be properly separated, the Board shall forthwith cause adequate accommodation to be procured for the reception of the healthy; and, when the Medical Practitioner recommends that the sick person shall not be removed, but that the To provide for the separation of the sick from the healthy in the same dwelling.



healthy shall be removed from the same room in which the sick person is lying, the Board shall cause the other inmates of such room to be removed to some convenient place of reception.

13. The Board shall, in dwellings where Cholera or Diarrhœa exists, cause proper disinfectants to be used in sufficient quantities for the purpose of disinfecting the discharges from the sick, and the bedding, clothing, and other things thereby infected, and the utensils and privies in which such discharges may have been received.

14. The Board shall cause every article of clothing, bedding, or furniture which shall have been infected with any such discharge, and which they shall find incapable of being speedily disinfected, to be forthwith destroyed, the Board within a reasonable time replacing all such articles, or paying the reasonable value to the owner.

15. If it be shown to the Board that any drinking-water used in their district is polluted, they shall take measures, with as much expedition as possible, for procuring wholesome water to be supplied in its stead, so far as the case requires, to the inmates of the houses in their district, and for preventing, as far as possible, the further use of the polluted water. And every Board owning or having possession of any waterworks for the supply of water shall cause the reservoirs, cisterns, pipes, pumps, and other apparatus belonging thereto, to be carefully examined, cleansed, and purified, and other necessary measures to be taken so that the water may be supplied without impurity.

16. The Board shall make due arrangements with undertakers and with the proper authorities of the churchyards, burial grounds, and cemeteries of their district, so that coffins may be ready to be supplied immediately on demand and interments speedily taken place in the cases of deaths arising from Cholera or Diarrhœa, and the Board shall, when informed of any such death, cause the corpse to be buried with the earliest possible despatch.

17. Where any death shall occur from Cholera or Choleraic Diarrhœa, no collection of persons shall assemble in the room where the corpse is, and no waking of the dead shall be allowed.

18. The Board shall cause the immediate removal, from any room which living persons inhabit, of the corpse of every person dying from Cholera or Choleraic Diarrhœa, until the time of its interment, and shall cause such means to be adopted for preventing the spread of infection from the corpse as their Medical Adviser shall recommend.

19. *If the Guardians shall be informed that Cholera or Choleraic Diarrhœa exists, or within three days previously has existed, in any Ship or Vessel which may be lying within their Union or Parish, they shall cause the same to be forthwith visited, inspected, and otherwise dealt with, according to the circumstances of the case, in like manner as if it were an inhabited house on shore, and shall give all such medical and other directions in reference to the persons in such Vessel or Ship, as shall be requisite for preventing the spread of the disease, and for the disinfection or disposal of any things which may be infected or may have been exposed to infection, subject always to the provisions of any Order of Council issued under the Quarantine Laws for the time being in force in such Union or Parish.\**

20. *The captain, master, or other officer in charge of any Ship or Vessel lying in any part or arm of the sea within the jurisdiction of the Admiralty, but not comprised within any Union or Parish, in which Ship or Vessel any case of*

To provide disinfectants and to cause things and places to be disinfected.

To cause infected goods to be destroyed.

To procure good water in place of that which is polluted.

Provision for burials.

Assemblage of persons at waking the dead prohibited.

Corpses to be kept separate from the living.

Guardians to take precautions as to ships and vessels lying within their Union or Parish.

Provision for ships or vessels in parts or arms of the sea having Cholera on board.

\* Repealed by Order of Council of Aug. 25, 1866.—J.S.

*Cholera or Choleraic Diarrhœa exists, or within three days previously has existed, shall obey every direction in writing addressed to him by the Guardians of the nearest Union or Parish signed by their Chairman or Clerk, in reference to the Medical and other treatment of the sick and other persons on board, with the view of preventing the spread of the disease, or to the disposal of the body of any person dead of the disease, or to the disinfection and disposal of the things infected with the disease, or otherwise to the removal of any unhealthy condition of the Ship or Vessel.*

21. The Clerk of the Board shall every Monday send by post to the Medical Officer of the Privy Council, a return of the number of new cases of Diarrhœa or Cholera which have, during the week ended on Saturday midnight last, come under the cognizance of the Board, and of the number of recoveries, and the number of deaths, with such other particulars as such Medical Officer shall from time to time require. The Return shall be in the following form, or to the like effect:—

Union or Parish.

*Weekly Return of Cases of Cholera or Diarrhœa for the Week ending on Saturday last.*

NEW ATTACKS during the Week	-	-	-	-
DEATHS during the Week	-	-	-	-
RECOVERED during the Week	-	-	-	-
Total Number of Cases NOW UNDER TREATMENT	-	-	-	-

Date \_\_\_\_\_ 1866.

(Signed) \_\_\_\_\_ Clerk to the Board.

22. The Board shall, from time to time, as they shall find expedient, issue, publish, and distribute in placards, hand-bills, or other communications, such admonitory notices to the owners and occupiers of property within their district as to the provisions of the Acts for the Removal of Nuisances as shall appear to be requisite, and in a like manner publish all such medical advice and such directions and instructions as in their judgment shall be necessary to afford aid to persons attacked with Cholera or Diarrhœa, or for the carrying of these Regulations into execution, and inform the public what special arrangements have been made for affording medical or other assistance in the district.

23. All Officers, Assistants, and Servants of the Board are ordered, and all Medical Practitioners and other persons inhabiting within the district of the Board are requested, to supply information and give their aid to the utmost of their ability to the Board in the execution of these regulations and directions.

24. In Parishes and Townships not comprised in a Union or under a separate Board of Guardians, the Clerk, Governor, or the Overseers, as the case may be, shall, so far as they can according to the extent and circumstances of their Parish or Township, carry the foregoing Regulations into execution.

25. The word "Union," as used herein, shall be taken to include not only a Union of Parishes formed under the provisions of an Act passed in the fifth year of the reign of His late Majesty King William the Fourth, entitled "An Act for the Amendment and better Administration of the Laws relating to the Poor in England and Wales," but also any union of Parishes incorporated or united for the relief or maintenance of the poor under any Local Act of Parliament.

Statistical returns to be obtained.

Board to publish notices.

General Order and exhortation for aid to the Board.

Provision for Parishes not in Union or under a Board of Guardians.

Interpretation clause.

And the word "Guardians," as used herein, shall be taken to include not only Guardians appointed or entitled to act under the provisions of the said last-mentioned Act, but also any Governors, Directors, Managers, or Acting Guardians entitled to act in the ordering of relief to the poor from the Poor Rates under any Local Act of Parliament.

[DIRECTIONS and REGULATIONS of like effect were issued (b.) for Places within the Metropolis.—Ed.]

(c.) AMENDED REGULATIONS of August 25th as to SHIPPING.

Amended  
Regulations as  
to Shipping.

1. In this Order—

The term "ship" includes vessel or boat :

The term "master" includes the officer or person for the time being in charge or command of a ship.

The term "cholera" includes choleraic diarrhœa :

The term "Nuisance Authority" has the same meaning as in "The Sanitary Act, 1866 : "

2. The Master of every ship within the district of a Nuisance Authority, having on board any person affected with cholera, or the body of any person dead of cholera, or anything infected with or that has been exposed to the infection of cholera, shall, as long as the ship is within such district, moor, anchor, or place her in such position as from time to time the Nuisance Authority directs.

3. If at any time a Nuisance Authority is informed that cholera exists, or within three days previously has existed, in a ship within its district, such authority shall cause the ship to be forthwith visited, inspected, and otherwise dealt with (according to the circumstances of the case), in like manner as nearly as may be as if the ship were a house within the district of such authority, and shall give all such medical and other directions with reference to the persons therein, as seems to such authority requisite or proper for preventing the spread of the disease therefrom, and for disinfection or disposal of any thing infected, or that has been exposed to infection therein or therefrom.

[Here follows (d.) MEMORANDUM on the PRECAUTIONS to be taken against CHOLERA, under the REGULATIONS recently issued by the LORDS of the COUNCIL, which it is not necessary to reprint, as it is to be found in an amended form in No. I., New Series Local Government Board Reports.—Ed.]

(c.) GENERAL MEMORANDUM ON THE PROCEEDINGS WHICH ARE ADVISABLE IN PLACES ATTACKED OR THREATENED BY EPIDEMIC DISEASE.

Proceedings  
advisable against  
Epidemic  
Diseases.

1. Wherever there is prevalence or threatening of cholera, diphtheria, typhus, or any other epidemic disease, it is of more than common importance that the powers conferred by the Nuisances Removal Acts, and by various other laws for the protection of the public health, be well exercised by those in whom they are vested.

2. If the danger be considerable, it will be expedient that local authorities, in taking measures against it, avail themselves of the best medical advice which their district or its neighbourhood can supply.

3. Proper precautions are equally proper for all classes of society. But it is chiefly with regard to the poorer population, therefore chiefly in the courts and

alleys of towns, and at the labourers' cottages of country districts, that local authorities are called upon to exercise vigilance, and to proffer information and advice. Common lodging-houses, and houses which are sub-let in several small holdings, always require particular attention.

Proceedings  
advisable against  
Epidemic  
Diseases.

4. Wherever there is accumulation, stink, or soakage of house-refuse, or of other decaying animal or vegetable matter, the nuisance should as promptly as possible be abated, and precaution should be taken not to let it recur. Especially all complaints which refer to sewers and drains, or to foul ditches, and ponding of drainage, or to neglect of scavenging, should receive immediate attention. The trapping of house-drains and sinks, and the state of cesspools and middens, should be carefully seen to. In slaughter-houses, and other places where beasts are kept, strict cleanliness should be enforced.

5. In order to guard against the harm which sometimes arises from disturbing heaps of offensive matter, it is often necessary to combine the use of chemical disinfectants with such means as are taken for the removal of filth; and in cases where removal is for the time impossible or inexpedient, the filth should always be disinfected. Disinfection is likewise desirable for unpaved earth close to dwellings, if it be sodden with slops and filth. Generally, where cholera or typhoid fever is in a house, the privy requires to be disinfected.

6. Sources of water-supply should be well examined. Those which are in any way tainted by animal or vegetable refuse, above all, those into which there is any leakage or filtration from sewers, drains, cesspools, or foul ditches, ought no longer to be drunk from. Especially where the disease is cholera, diarrhœa, or typhoid fever, it is essential that no foul water be drunk.

If unfortunately the only water which for a time can be got should be open to suspicion of dangerous organic impurity, it ought at least to be boiled before it is used for drinking, but then not to be drunk later than twenty-four hours after it has been boiled. Or, under medical or other skilled direction, water, in quantities sufficient for one day's drinking in the house, may be disinfected by a very careful use of Condry's red disinfectant fluid, which should be added to the water (with stirring or shaking) in such number of drops that the water, an hour afterwards, shall have the faintest pink colour which the eye can distinctly perceive. Filtering of the ordinary kind cannot by itself be trusted to purify water, but is a good addition to either of the above processes. It cannot be too distinctly understood that dangerous qualities of water are not obviated by the addition of wine or spirits.

7. The washing and lime-whiting of uncleanly premises, especially of such as are densely occupied, should be pressed with all practicable dispatch.

8. Overcrowding should be prevented. Especially where disease has begun, the sick-room should, as far as possible, be free from persons who are not of use or comfort to the patient.

9. Ample ventilation should be enforced. It should be seen that window-frames are made to open, and that windows are sufficiently opened. Especially where any kind of infective fever has begun, it is essential, both for patients and for persons who are about them, that the sick-room and the sick-house be constantly well traversed by streams of fresh air.

10. The cleanliest domestic habits should be enjoined. Refuse-matters which have to be cast away should never be let linger within doors, and things which have to be disinfected or cleansed should always be disinfected or cleansed without delay.

11. Special precautions of cleanliness and disinfection are necessary with regard to infective matters discharged from the bodies of the sick. Among



Proceedings  
advisable against  
Epidemic  
Diseases.

discharges which it is proper to treat as infective, are those which come, in cases of small-pox, from the affected skin; in cases of cholera and typhoid fever, from the intestinal canal; in cases of diphtheria, from the nose and throat; likewise, in cases of any eruptive or other epidemic fever, the general exhalations of the sick. The caution which is necessary with regard to such matters must, of course, extend to whatever is imbued with them; so that bedding, clothing, towels, and other articles, which have been in use by the sick, do not become sources of mischief, either in the house to which they belong, or in houses to which they are conveyed. Moreover, in typhoid fever and cholera, the evacuation should be regarded as capable of communicating an infectious quality to any night-soil with which they are mingled in privies, drains, or cesspools; and this danger is best guarded against by thoroughly disinfecting them before they are thrown away: above all, they must never be cast where they can run or soak into sources of drinking water.

12. All reasonable care should be taken not to spread infective disease by the unnecessary association of sick with healthy persons. This care is requisite, not only with regard to the sick-house, but likewise with regard to day-schools and other establishments wherein members of many different households are accustomed to meet.

13. Where dangerous conditions of residence cannot be promptly remedied, it will be best that the inmates, while unattacked by disease, remove to some safer lodging. If disease begins in houses where the sick person cannot be rightly circumstanced and tended, medical advice should be taken as to the propriety of removing him to an infirmary or hospital. In extreme cases, special infirmaries may become necessary for the sick, or special houses of refuge for the endangered.

14. Privation, as predisposing to disease, may require special measures of relief.

15. In certain cases, special medical arrangements are necessary. For instance, as cholera in this country almost always begins somewhat gradually in the comparatively tractable form of what is called "premonitory diarrhœa," it is essential that, where cholera is epidemic, arrangements should be made for affording medical relief without delay to persons attacked, even slightly, with looseness of bowels. So again, where small-pox is the prevailing disease, it is essential that all unvaccinated persons (unless they previously have had small-pox) should very promptly be vaccinated; and re-vaccination should also be offered, both to persons above puberty who have not been vaccinated since childhood, and to younger persons whose marks of vaccination are unsatisfactory.

16. It is always to be desired that the people should, as far as possible, know what real precautions they can take against the disease which threatens them, what vigilance is needful with regard to its early symptoms, and what (if any) special arrangements have been made for giving medical assistance within the district. Especially in case of small-pox or of cholera, such information ought to be spread abroad by printed hand-bills or placards. In any case where danger is great, house-to-house visitation by discreet and competent persons may be of the utmost service, both in quieting unreasonable alarm, and in leading or assisting the less educated and the destitute parts of the population to do what is needful for safety.

17. The present memorandum relates to occasions of emergency. Therefore the measures suggested in it are all of an extemporaneous kind; and permanent provisions for securing the public health have not been in express terms insisted

on. It is to be remembered, however, that in proportion as a district is habitually well cared for by its Sanitary Authorities, the more formidable emergencies of epidemic disease are not likely to arise in it.

18. For detailed advice on Disinfection, see the Office Memorandum on that subject.

JOHN SIMON.

(f.) MEMORANDUM ON DISINFECTION.

N.B.—It is to cleanliness, ventilation, and drainage, and the use of perfectly pure drinking water, that populations ought mainly to look for safety against nuisance and infection. Artificial disinfectants cannot properly supply the place of those essentials, for, except in a small and peculiar class of cases, they are of temporary or imperfect usefulness. That no house-refuse, not only no excremental matter but also no other kind of dirt or refuse, should remain on or about inhabited premises, is a first rule against infection. That the air within the house should never in any part of the house be stagnant, but should always be in course of renewal from without by uninterrupted and abundant supplies of fresh air, is a condition of equal importance. And that all water meant to be used for drinking or cooking should be drawn from sources which cannot have been polluted by any kind of refuse-matter, is a third most important rule for the avoidance of infection.

If dwelling-places have within them any odour of drainage, particular examination should be made (1) whether the filth which house-drains are meant to carry away is retained in or near the premises in ill-made drains, or sewers, or cesspools, or perhaps is leaking from house-drains within the house; and (2) whether, inside the house, the inlets of drains and sinks are properly trapped; and (3) whether the drains and sewers are sufficiently ventilated outside the house. All waterclosets within houses should have free openings for ventilation from and into the outer air. Of a cesspool, the only true disinfection is to abolish it. In country places, where proper drainage is not provided, the nuisance of open privies may be best avoided by the use of the so-called earth-closet.

If a sewer is much complained of, as stinking into the public way, generally the presumption is, that, from original ill-construction or some other cause, it does not properly fulfil its object, but has filth accumulated and stagnant in it; and such a sewer, besides occasioning nuisance in the public way, may be the source of serious danger to the inhabitants of houses which drain into it. It is most important that all sewers should be well ventilated at points where their effluvia will be least injurious; and ordinary drain-pipes may be used to conduct the effluvia to a distance.

For convenience, in this memorandum, the word "disinfectants" is used to cover, not only those true disinfectants which permanently destroy infective matter, but also those agents which merely arrest the process, or absorb the offensive products, of organic decomposition.

For artificial disinfection on a large scale, the agents which most commonly prove useful are—quick-lime, chloride of lime, carbolic acid, sulphate of iron, perchloride of iron, and chloride of manganese. The following are also efficient disinfectants, but, as being dearer, are less suited, for large operations: sulphate



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Disinfection.

of zinc, chloride of zinc, chloride of soda, and permanganate of potash. In certain cases chlorine gas, or nitrous acid gas, or sulphurous acid gas, may advantageously be used; and, in certain other cases, powdered charcoal or fresh dry earth.

*Quick-lime* ought to have been recently burnt, and may be used either in the form of dry powder, or stirred up with about ten times its bulk of water as milk of lime. *Chloride of lime* is best used with water, and thoroughly mixed with it, in the proportion of a pound to the gallon; or, of the solution, as commonly sold, about two pints may be mixed with a gallon of water. *Carbolic acid* (in the fluid form in which it is commonly sold) should be dissolved in about eighty times its volume of water, with which it must be mixed by strong shaking in a closed vessel. *Sulphate of iron* should be dissolved in ten times its weight of water; a solution which is best effected by employing hot water and stirring. Of *perchloride of iron* and *chloride of manganese*, the common concentrated solutions may be used, diluted with ten or twelve times their bulk of water. *Sulphate of zinc* should be dissolved in about ten times its weight of warm water. Of *chlorine of zinc*, the common concentrated solution may be diluted with eight or ten times its bulk of water.\* Of *chloride of soda*, the common solution may be used like that of chloride of lime. Of *permanganate of potash*, an ounce may be dissolved in a gallon of water.†

All disinfectants must be used in quantities proportionate to the amount of matter or surface to be disinfected. When the matters requiring to be disinfected have an offensive smell, the disinfectant should be used till this smell has entirely ceased, and as often as the smell recurs, the disinfectant must again be used.

1. During the emptying of privies and cesspools, and whenever else temporary disinfection is required for them, carbolic acid, or sulphate of iron, or perchloride of iron, or chloride of manganese, or chloride of zinc, will be found available. A dilute solution (as above) of one of those agents should be poured into the privy or cesspool, from a quart to a pailful at a time, till the desired effect is obtained. Especially where cholera or typhoid fever is present, privies and cesspools ought to be very frequently flooded in this manner. The best test of their being adequately disinfected is the entire absence of faecal or ammoniacal odour.

2. Heaps of manure or other filth, if it be for the time impracticable or inexpedient to remove them, should be covered, to the depth of two or three inches, with a layer of freshly burnt vegetable charcoal in powder. Freshly burnt lime may be used in the same way, but is less effective than charcoal. If neither charcoal nor lime be at hand, the filth should be covered with a layer, some inches thick, of clean dry earth. For a privy which has only solid contents, the same sort of treatment is applicable. Earth near dwellings, if it has become offensive or foul by the soakage of decaying animal or vegetable matter, should be treated on the same plan.

3. If running sewage, about to be used in agriculture, require to be disinfected, the chloride of manganese or perchloride of iron may be best used;‡ but if the sewage is to pass into a river, or into any pond or canal, where it might again become offensive, chloride of lime is to be preferred; and in this case a pound of good chloride of lime will generally suffice to disinfect 1,000 gallons of the sewage.

\* Or the preparations respectively known as Burnett's and Crewe's disinfectant solutions may be employed.—J.S.

† Or Condry's disinfectant fluids, which contain manganic and permanganic salts, may be used.—J.S.

‡ In some such cases McDougall's process, as practised by him at Carlisle, may be applicable; and his powder may also be applicable to cases mentioned in § 1.—J.S.

For foul ditches and other stagnant drainage, chloride of lime is also the proper disinfectant. Memorandum on Disinfection.

4. Where it is desirable to disinfect, before throwing away, the evacuations from the bowels of persons suffering from cholera or typhoid fever, some of the disinfectant (which here may best be chloride of lime) should be put into the bed-pan or other vessel before it is used by the patient, and some more should be added immediately after. Its thorough mixture with the evacuation should be ensured. Care should also be taken that portions of the discharges do not remain about the patient's body or in his dress.

5. Linen and Washing Apparel requiring to be disinfected may be set to soak in water containing per gallon about an ounce either of the common clear solution of chloride of lime or of that of chloride of soda. Or the articles in question may be plunged into boiling water, and afterwards, when at wash, be actually boiled in the washing water.

6. Woollens, Bedding, or Clothing which cannot be washed, may be disinfected by exposure for two or more hours, in chambers constructed for the purpose, to a temperature of F. 210°-250°. When this cannot be done, the natural disinfecting process of prolonged exposure to air, sun, and rain, ought to be had recourse to.

7. For the disinfection of the interior of houses, the ceilings and walls should be washed with warm quick-lime water. The woodwork should be cleansed with soap and water, and subsequently washed with water containing in each gallon about two ounces of the clear solution of either chloride of lime or chloride of soda.

8. A room no longer occupied may be disinfected by chlorine gas, or nitrous acid gas, or sulphurous acid gas. And for this purpose the gases may be produced in the room as follows:—chlorine gas, by pouring over a quarter of a pound of finely powdered black oxide of manganese, contained in a jar, half a pint of muriatic acid previously mixed with a quarter of a pint of water; or by pouring over a quarter of a pound of chloride of lime, contained in a jar, a quarter of a pint of muriatic or dilute sulphuric acid;—nitrous acid gas, by pouring over an ounce of copper shavings or turnings, contained in a deep jar, three ounces of concentrated nitric acid;—sulphurous acid gas, by burning an ounce or two of flowers of sulphur in a pipkin. The process of disinfecting a room by any of these gases requires several hours; and while it is going on, all doors, chimneys, and windows of the room must be kept carefully closed. Precautions to this effect should have been taken before the chemicals are mixed, as the person who starts the process (having to avoid the gases) must not afterwards loiter in the room. When the process is at an end, doors and windows should be fully opened.

9. Ships (except the class of cattle-ships for which special treatment is required) may be disinfected on the same plan as houses. The process should be conducted as distantly as may be from the shore and from other vessels. All the compartments of the ship should first be fumigated with some disinfectant gas, best with chlorine or nitrous acid, and then all the accessible woodwork (in and out) should be washed with a solution of chloride of soda or lime. The bilges require particular attention, and before they are first pumped some pounds of chloride of lime in water, or some gallons of solution of perchloride of iron, should be poured into them, for the purpose of disinfecting the bilge-water. All permanent shingle and small-grained ballast should be replaced by fresh.

It is most frequently with reference to the infection of yellow fever that ships require to be disinfected, and generally in such cases the cargo requires the same

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treatment as the ship. So far, therefore, as the cargo has not been completely disinfected in the course of the disinfection of the ship, and so far as is practicable, it ought, before it is landed, and part by part as it is removed, to be disinfected by free sprinklings with the solution of chloride of lime or soda. Also in these cases it is to be remembered that persons from on board the infected ship (especially those who have been most in its hold) may carry infection about their persons—in precaution against which danger it is desirable that the persons should have complete baths of soap and water and that their clothes should partake of the general fumigation of the ship. The person who conducts the fumigation of a ship (especially where there is question of yellow fever) ought not at first to enter the hold, but merely to hang down the hatches, or otherwise place within the hold, the vessel which contains his chemical mixture.

JOHN SIMON.

[Earlier editions of the two last memoranda (e) and (f) had been given six years previously in Report III.—ED.]

## PATHOLOGICAL NOTES.

## RELATION OF CHOLERA TO LOCAL DIFFERENCES OF SOIL.

## NOTES ON MR. RADCLIFFE'S OBSERVATIONS.

Relation of  
cholera to local  
differences of  
soil.

Subsequently to the making of his report, and while it was in course of being printed, Mr. Radcliffe, at my request, made a special inquiry as to the soil on which the workhouse is built, and informed me as follows:—"A glance at the geological map will show that the buildings are partly situated upon the edge of a field of brick-earth, partly on gravel. The infirmary indeed is placed entirely beyond the edge of the brick-earth and upon gravel. But I learn from the architect, Mr. Richard Tress, that the foundations of the entire building, with the exception of the imbecile ward, are sunk into a clean, small, yellow gravel with little sand. The imbecile ward was built upon the site of an old and tolerably deep pond. Mr. Tress is unable to speak precisely of the nature of the subsoil at this spot, but he intimates that the bottom of the pond was clay, the superficial beds having been cleared away. There is probably much 'made-earth' beneath the building, formed in filling up the pond beneath the imbecile ward."

Mr. Radcliffe also at my request, and with the assistance of Mr. Wm. Whitaker, of the Geological Survey of England, made a special investigation of the soil upon which the School is built, and informed me as follows:—"The investigation brought to light the hitherto unsuspected fact that the school and premises stand upon a thick bed of fine brick-earth, and not upon gravel, as previously supposed. A boring in the boys' playground, a little in the rear of the main building, gave 5 feet of made soil and 11½ feet

"of brick-earth, the latter not being bottomed. The streets immediately surrounding the school, so far as could be ascertained, stand upon made earth and gravel."\* The interest of this fact, in relation to Professor Pettenkofer's doctrine of the influence of soil in limiting epidemics of cholera, cannot be overlooked.—J.S., May 31st.

## EAST LONDON EPIDEMIC OF CHOLERA.

## NOTE ON MR. RADCLIFFE'S REPORT.

It is in many ways a question of vast public importance, whether last year's terrible outbreak of cholera in the eastern districts of London was produced by the distribution of infected water from certain reservoirs of the East London Water Company. Mr. Radcliffe's very elaborate and impartial inquiry has led him to the conclusion that it was so: and the form of his conclusion (a form which may have to be distinguished from the substance) is, that the water of the reservoirs, considered as drinking-water, had in it a power of direct infectiveness for those who drank it.

After giving my most careful judgment to the case, I feel bound to say that the facts adduced by him seem to me, as a whole, almost irresistibly to force the substance of his conclusion on the mind; but some of the exceptional cases to which he adverts in pages 312-325 of his report are apparently strong facts to the contrary. And having regard to the extreme gravity of the charge which is made against the water company, I feel it right distinctly to admit that I do not at present see my way to explain the apparent contradictions. It may be that the real explanation lies, even for all these cases, in conditions like those to which Mr. Radcliffe adverts in the important statement (printed in italics) at pages 324-5; in which event of course they would not in any degree contradict Mr. Radcliffe's general conclusion: but I confess I do not see how that sort of explanation is likely to cover the very striking immunity of the Limehouse school.

I need hardly say that I have with much care considered the whole matter of the East London epidemic in the light of Professor v. Pettenkofer's doctrine as to the laws of cholera epidemics. And the study of the matter in that point of view does, no doubt, show some facts which Pettenkofer would deem extremely significant. In the first place, in searching for conditions which might explain the special severity of cholera in those eastern districts of London, we come on the fact that, up to the end of 1865, in the affected territory, as far eastward as the river Lea, the construction of the main low-level sewer of the metropolitan drainage had, for a year or two, been constantly in progress with such more or less pumping of water from the sub-soil as had been necessary for the protection of the works; and that afterwards, for the six months immediately before the outbreak, the Isle of Dogs branch of this sewer (shown in Mr. Radcliffe's map as a red line running from Blackwall to Bromley) had been in progress, and had been attended with a continuous, but not very large, removal of water from the

\* I have to thank the Limehouse Board of Guardians for the readiness with which they granted me permission to make this investigation of the soil, and Mr. Swepstone, the clerk to the guardians, and Mr. Dunch, the architect and surveyor to the Board of Works, for their great kindness in facilitating the investigation.—J.S.



East London epidemic of cholera.

*gravel sub-soil.\** Now, in Pettenkofer's doctrine, the moment when ground-water is sinking in porous soil is the moment when a district is most disposed to choleraic infection; and it will be evident that the pumping which was and had been in progress in the parts referred to must have tended (I cannot say how much, nor over how wide an area) to bring the ground there, in the summer of 1866, into that "zeitliche Predisposition" for cholera. This fact, however, loses much of its significance when it is noticed that in the districts east of the Lea, where cholera began with even greater severity than in the last-mentioned districts, no such influence had been in operation:—indeed, I am assured by Mr. Rawlinson (whose evidence I must deem quite conclusive) that, for the last six or seven years, the permanent pumping arrangements connected with the sewerage east of the Lea have, to his knowledge, been such that no considerable oscillations in the water-level of the sub-soil have been possible. The second fact which I have to mention belongs to the exceptional case of the Limehouse school, and seems to illustrate Pettenkofer's doctrine of local immunities. For, in searching for the conditions of the immunity of that school amid the general sufferings of its district, the only exceptional condition we could find is one of a geological sort: *the school stands as it were on an island of brick-earth, while all the immediately surrounding district is of gravel.*† There was another very

\* The following table, for which I am indebted to Mr. Cooper, of the Metropolitan Board of Works, gives the best means I can procure for estimating the quantity of water removed in this part of the undertaking:—J.S.

CONSTRUCTION OF SEWERS, Isle of Dogs Branch of Low-Level Sewer, between Main Low-Level at Bromley Railway Station and East India Dock Road.

Situation of pumping station.	Dates when at work.	Number of Men pumping.	Probable effect.
No. 1 Shaft on private ground near St. Leonards Road and Railway Station.	From Feby. 5th to May 26th, 1866.	(4-in. pumps.) 2 men night and day.	Drawing clear and apparently good water from the gravel.
No. 2 Shaft St. Leonards Road.	Feby. 12th to May 19th.	2 men night and day.	Do.
No. 3 do. do.	Feby. 19th to May 26th.	2 men night and day.	Do.
No. 4 do. do.	Feby. 26th to July 7th.	2 men night and day.	Do.
No. 5 do. Brunswick Road.	April 2d to July 21st.	2 men night and day.	Do.
No. 6 do. do.	April 2d to July 28th.	2 men night and day.	Do.
No. 7 do. do.	April 21st to Aug. 4th.	2 men night and day.	Do.
No. 8 do. do.	April 23d to July 7th.	2 men night and day.	Do.
No. 9 do. Robin Hood Lane East India Dock Road.	June 18th to Sept. 1st.	2 men night and day.	Do.

† It will be noticed in the geological cholera-map that the other parts of the district marked as brick-earth have a fair allotment of cholera-dots on them; but Mr. Radcliffe is informed that in those parts the brick-earth has been very extensively removed to give material for successive buildings, and the exact effect of these removals, in relation to our present subject-matter, could not be ascertained without innumerable (practically impossible) house-to-house examinations of the ground.—J.S.

interesting case, that of the City of London workhouse, where the "caprice" to be explained consisted in the choleraic affection of a small part of an otherwise unaffected large establishment; and our geological map (which represents the workhouse in question as standing on two different soils) suggested that in this curious little epidemic the parts of the building had been visited or not visited by cholera accordingly as they stood on the one soil or the other; but it will have been seen in Mr. Radcliffe's report that the architect of the building, in answer to our very minute inquiries as to the local differences of the soil, gave us to understand that of the represented brick-earth none had been left beneath the building, and that nearly all the building (unaffected equally with affected parts) had its foundations on gravel. It is possible that some other apparently exceptional facts in the East London epidemic may be more or less plausibly explained from Pettenkofer's point of view:—in regard of Stamford Hill, for instance, the comparatively high-level may be said to count for something; and in regard of North Woolwich it can be urged that so very low a district, in immediate proximity to the river, may easily have had something exceptional in the state of its ground-water and soil;\* but there is too little detailed information on these and similar parts of the case for me to venture on any judgment concerning them.

On the whole, I fear it must for the present remain doubtful whether the influences to which Pettenkofer assigns so much importance were really potent in the East London epidemic, either as predestining its general severity, or as permitting exceptional facts within its area. But I may observe that the acceptance of that belief would not imply an acquittal of the East London Water Company as regards the causation of the epidemic. For in his doctrine the predispositions of time and place count for nothing till the exciting cause of the epidemic comes to bear on them; and high level or low level, brick earth or gravel, rising ground-water or falling ground-water, would all have been matters of indifference to the East London population unless the specific germs of cholera-contagium had been scattered broadcast in the territory. How this terrible scattering of the germs of the disease took place is the question which Mr. Radcliffe's inquiry aimed at answering; and his answer in substance is that the East London Water Company did the mischief.

I have said that it may be necessary to distinguish between the substance and the form of Mr. Radcliffe's conclusion. In proportion as Pettenkofer's views may prove right, doubts will occur whether the morbid power of the Old Ford water in those eastern districts (granting it to have been in fault) must have depended on the water's being drunk. It may be urged that, if the drinking of that water was the essential condition of the outbreak, it is difficult to conceive how cholera should not have been carried indiscriminately wherever the water was drunk, difficult to conceive how differences of soil or altitude could vary the infectiveness of the water within the same continuous area of potation. But, for the substance of Mr. Radcliffe's conclusion, is it necessary to assume that the water was drunk? So far as a cholera patient coming into a district can infect the population in other ways than through their drinking-water, must it not equally be the case that a water, infected with cholera-contagium, universally distributed and splashed about and wetting and soaking within a predisposed

\* In two opposite points of view the fact claims to be noted, as possibly interesting, that North Woolwich, having no sewers, could not participate in any influence (good or bad) which the sewerage-system east of the Lea may be deemed to have exerted on the eastern moiety of the outbreak.—J.S.



1  
1 East London  
epidemic of  
cholera.

district, is dangerous independently of its being drunk? Or is it possible that under some conditions a water may be able to infect a soil, and mediate a population, with cholera, and yet not necessarily at the same time be an immediate cause of cholera to those who drink it? Our knowledge of the cholera-contagium, and of its modes of operation on the human body, is far too imperfect for me to pretend to answer these questions with all the qualifications which would be necessary to make the answer applicable to the present discussion. The importance, however, of the distinction which I have drawn will, I think, be evident. For if Mr. Radcliffe's conclusion is to be sustained exactly in the form in which he has drawn it (*i.e.*, virtually considering "distribution" and "drinking" to be equivalent terms in the argument) then perhaps he may be fairly challenged to show, as a rule with no considerable true exceptions, that the Old Ford water-supply carried cholera wherever it was drunk; and an exception really determined by difference of soil would seem almost hopelessly unintelligible. But if the particular form of the conclusion be set aside, and the conclusion simply affirm that the distribution of the Old Ford water caused the East London outbreak of cholera, then, to whatever extent that distribution operated on and through the soil of the territory, so far Pettenkofer's doctrine may admit of more or less plausible application to explain the partialities of the outbreak.

#### HOURS OF DEATH IN CHOLERA.

##### NOTE ON DR. SUTTON'S REPORT.

Hours of death  
in cholera.

The average distribution of Dr. Sutton's 118 deaths through 24 hours of day and night would give a rate of about 5 deaths for each hour. From this average rate the most important deviation seemed to be in the four morning hours, 7-11, when the rate was  $7\frac{1}{2}$  per hour. An excess of less marked degree appeared also in the four corresponding evening hours, when the rate was  $6\frac{1}{2}$ , and in the last two of those hours, 8. Of course Dr. Sutton's numbers are too few, greatly too few, to justify any general conclusions; and it may therefore be convenient to refer to the facts on this question which were collected at Leipzig in the late epidemic. Dr. Schmieder, in his lately published statistics of that visitation, gives the hours of death of 1,278 cases; and it is noticeable that his hours of least mortality were just those forenoon hours when the Whitechapel deaths were most numerous. In Leipzig the number of deaths per hour, if the total had been uniformly distributed, would have been  $53\frac{1}{4}$ ; but in fact the hourly distribution of deaths in the four successive quarters of the day, counting from midnight, averaged about as follows: during the first quarter, 51; during the second quarter (which on the Whitechapel analogy ought to have been highest) 46; during the third quarter, 60; during the fourth quarter, 56. Evidently nothing as to the natural history of cholera can be inferred from facts of this sort, unless they be accumulated in very large numbers; nor, unless also the reader be tolerably acquainted with the *horaria* (as to nursing, &c.) of the hospitals whence the facts have been reported. In any future registration of such facts it would be desirable to make separate enumeration of deaths in collapse, as distinguished from deaths in reaction and fever. Of course, too, in discussing the subject of hour of death, regard must be had to the hour of so-called "attack," *i.e.*, the hour of manifestation of severe symptoms. And if this should seem to be governed, at least locally, by some general law, the determining influence of local modes of life would need consideration.

#### THEORY OF CHOLERA COLLAPSE.

##### NOTE ON DR. SUTTON'S REPORT.

To the parts of Dr. Sutton's report which are on the theory of collapse, I append a few remarks of my own on the same subject. Theory of cholera collapse.

Dr. Parkes, in his *Researches into the Pathology and Treatment of the Asiatic or Algid Cholera*, published in 1847, speaks of the collapse of cholera as a "variety of suffocation:" contending with great force, and from a considerable basis of facts, clinical and necroscopical, that the essence of the state of collapse is "a failure more or less complete in the transmission of the blood through the lungs." In order to account for that non-transmission he argues thus: "As the mechanical part of respiration is perfect, and as there is no impairment in the voluntary command of the respiratory muscles, and as the heart evidently beats in many cases till stopped by the want of blood on the left side, and by its accumulation on the right side, we are compelled to look for the cause of such arrest of the circulation in the only remaining element of respiration, namely, in the blood itself." The blood, he infers, is in a changed physical state which renders it more or less unable to pass along the smaller vessels in the system generally, and in the lungs in particular; and in explanation of this he suggests as not improbable that the "poison" of cholera may effect primary chemical changes in the fibrin of the blood.

Dr. George Johnson's theory of collapse, argued by him in various publications from 1854 to the present time, is in its main features an acceptance of the above; but while Dr. Parkes suggests for the assumed primary blood-poison in cholera, that it acts coagulatively or precipitatively on the blood, Dr. Johnson claims for the assumed poison that it has strongly irritant qualities; and while he follows Dr. Parkes in believing that an impeded pulmonary circulation is the central fact in the phenomenology of collapse, he explains the impediment as a spasmodic contraction of the muscular coats of the minute pulmonary arteries due to the irritativeness of his "poison."

The belief that the proximate cause of cholera is a "poison" first acting in the blood is common to Dr. Parkes and Dr. Johnson, as well as to many other writers; and Dr. Johnson builds on that belief his advocacy of a particular principle of treating cholera—the principle, namely, of "assisting nature," by emetics and purgatives, in what he deems to be her "salutary and curative efforts" of vomiting and purging: but Dr. Parkes's doctrine of the state of the circulatory system in collapse, and Dr. Johnson's doctrine of the dependence of that state on spasmodic closure of the minute pulmonary arteries, are doctrines which do not necessarily involve an acceptance of the "eliminative treatment" of cholera, nor pre-suppose any belief that cholera begins as a blood-disease. It is important that the different questions should not be jumbled together as one; particularly important now, because the notion of a primary blood-poison in cholera seems tending more and more to be superseded.

1. First, as regards the state of the circulation in collapse. Personally knowing Dr. Parkes's great accuracy of statement, I attach the utmost importance to the descriptions contained in his work. And their details do certainly in great part justify the generalisation which he makes of them.\* But

\* Yet it deserves notice that even among Dr. Parkes's own cases of death in collapse the post-mortem evidence of interrupted pulmonary circulation was not universal; and I may add, though without attaching equal importance to the fact, that a citation of miscellaneous authorities on the state of the heart and lungs in death by collapse (such a citation as was

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whether the morbid phenomena which he describes are rightly accounted for by the doctrine of arterial obstruction in the lungs (either such as he supposes, or such as Dr. Johnson supposes) is matter of much more doubt: for feebleness of heart-contraction appears to be an invariable fact in choleraic asphyxia; and so far as this affects (or at least predominantly affects) the right side of the heart, so far it tends to produce much such a disturbance of circulation as would result from the supposed arterial obstruction. Present opinion seems, I think, generally to be that, in the main it is the dynamical affection of the heart (not the supposed obstruction of pulmonary arteries) which gives the true explanation of Dr. Parkes's facts; but this would not of necessity imply, either for the pulmonary or for the aortic circulation, that all the arterial resistances are normal. Whatever ætiological view be taken of the connexion of the symptoms of collapse, it cannot be deemed unlikely that a much diminished volume and impaired fluency of the blood, when they have arisen, should excite certain phenomena of their own in the sphere of arterial contractility, as well as have their own physical consequences, nor again that certain changes of arterial tone should go with certain changes of cardiac action. Be this as it may, some of the phenomena presented in the aortic system in collapse are such as arterial contractility would seem very plausibly to explain. Such are some of the inequalities of temperature and circulation in the diseased body, not only as between internal and external parts, but as between different parts (external or internal) in the aortic circulation. Specially, for instance, I cannot conceive from what other basis to explain the tendency to equalization of temperature between external and internal parts which is apt to show itself in the fatal ending of collapse, and even to continue after death, as though a final relaxation of arterial rigidity permitted the blood at last to find way through its normal channels. And if the cold and cyanosed state of external parts in cholera be not to some extent under control of arterial contractility, I cannot conceive through what mechanism to explain that exceptional state of mammary circulation which permits the continued secretion of milk by nursing women who are in collapse.

2. The belief that a primary "blood-poison" is the proximate cause of cholera, the direct source equally of its intestinal and of its asphyxial manifestations, is, so far as I know, mere hypothesis. It has been much accepted as the only possible explanation of certain supposed, but very questionable, facts in the natural history of the disease; specially in explanation of the supposed fact, that the utmost collapse of cholera may concur with little or no affection of the intestinal canal. It is of supreme pathological importance to be right in the matter of these premisses. Is it, or is it not, true that choleraic asphyxia can

given in 1833 by Prof. Phœbus in chapters 5 and 6 of his classical *Leichenbefund bei der Orientalischen Cholera*) would show still less uniformity of evidence in that respect. Also, in my opinion, the assertion made by Prof. Griesinger (in § 483 of the admirable essay on cholera which forms part of his *Infections-Krankheiten in the Handbuch der Pathologie und Therapie*) deserves much weight: viz., "that the distention of the right cavities of the heart appears not to be present during life, as percussion gives (invariably?) a small area of cardiac dulness." Supposing the general accuracy of Dr. Parkes's descriptions to be conceded, judgment must, I think, be reserved on the meaning of the alleged exceptions. For, whatever question there may be as to the inter-dependence of the symptoms of cholera, it is certain that the disease, in proportion to its flux, tends to reduce more or less rapidly both the volume and the fluency of the blood; and till we know exactly what would be the ultimate anatomical expression of those changed physical states of the blood, taken by themselves, it is impossible to affix a right value to the cases of cholera where post-mortem appearances, or facts observed during life, have not answered to Dr. Parkes's general description of the anatomy of death in collapse.—J.S.

arise otherwise than in consequence of the bowel-disease? This question has been much perplexed, partly through the vast number of vague assertions which are current on the subject, and partly through an assumption which has often been prematurely, and perhaps wrongly, made, that the significance of the bowel-disease in cholera is to be measured by the quantity of the fluid secretion from the bowel. Properly to discuss the main question, that assumption must be disallowed, and the points be separately considered.

(a.) That the large, often enormous, fluid discharges which generally characterise cholera represent corresponding de-aquation and de-salination of blood and textures in the patient's body, and that such changes must at least for a time interfere to some considerable extent with all or most of the chemical processes of the body, cannot, I suppose, be disputed. And on the hypothesis that cholera begins in the bowels, it might seem probable that all, or nearly all, the facts of collapse and secondary fever would admit of being referred, directly or indirectly, to that generally enormous flux. Especially it would seem plausible to refer to the altered blood either a power of mechanical obstruction, or a power of provoking resistant muscular constriction, in the vessels through which it has to pass. At present, however, very strong arguments against any such doctrine of collapse are adduced. Some weighty statements on the subject, having in them every appearance of accuracy, are made, for instance, by Dr. Goldbaum in his recent report (published in *Virch. Arch.*, Feb. 1867) of the experience of the Berlin Cholera Hospital No. III., in the epidemic of 1866; a report which is the more valuable from the fact of the author's having been in part-charge of cholera hospitals in Berlin in the previous epidemics of 1853, 1854, and 1855. Dr. Goldbaum's conclusion, supported by many illustrative cases, is strongly against the doctrine that inspissation of the blood is the cause of the asphyctic state. He (like many previous observers—notably the chief Anglo-Indian authorities, and, in Europe, Magendie, Romberg, Parkes, and others) insists that the relation of flux to asphyxia is rather an inverse than a direct proportion, and that the cases of worst augury are cases which have fallen into collapse after but little or no vomiting and purging. He, moreover, expressly guards against undue importance being attached in such cases to the quantities of fluid (half or two-thirds of a gallon at the utmost) which may be retained within the patient's intestinal canal; pointing out that the contrast is with cases where perhaps as much as seven gallons are discharged by vomiting and purging, and that consequently no allowance made for intestinal contents can affect the truth of his proposition. In this context, too, it seems convenient to refer to the comparison which many experienced observers of both sorts of disease have drawn between the phenomena of cholera-collapse on the one hand, and those of the cold stage of malarious disease on the other. Dr. Goodeve, for instance, in his article on cholera in Reynolds's *System of Medicine*, arguing that "symptoms similar to collapse may be produced by poisons without any purging," observes that he has "seen people under the influence of malarious poison in Calcutta lie for hours as cold and pulseless, and as embarrassed in the breathing, as in cholera." No doubt both sorts of collapse have very much in common as regards their spheres of manifestation, and much also as regards the phenomena themselves; but of course the likeness between them does not exclude the possibility that they may be induced by very different causes.

(b.) As regards the other point, materials for judgment are less definite; but certainly, in the present state of information on the subject, the proposition is by no means established that cholera collapse ever occurs without bowel-disease enough probably to account for it. Abstraction of fluid, I need hardly observe,

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is not the only way by which abdominal lesions can affect the circulation of the blood. There are channels for nervous, as well as for humoral, sympathy; and the heart's action can be lowered to the utmost (whether with consensual changes of arterial tone, I know not) by abdominal lesions in which little or no fluid is expended. Physiologists will remember those admirable researches of Goltz\* and Bernstein†, which elucidate the exact course and mechanism of such sympathies; and every practitioner of medicine or surgery can recall instances where he has seen mortal collapse (substantially, so far as I know, not different from the collapse of cholera) produced by the very onset of traumatic and other abdominal inflammations, sometimes of no great apparent magnitude. In comparison with some of such instances, the least amount of bowel-disease which (so far as I know) has ever yet been found in the bodies of persons dead with the cholera-collapse must, I believe, be deemed very considerable. Doubtless there are cases on record where men, stricken with cholera-collapse, are said to have suddenly fallen, even numbers of them together, in the streets or elsewhere in their ordinary pursuits, "tumbling over each other lifeless," or as if "knocked down dead by lightning," or "as if they had drunk the concentrated poison of the 'upas tree.'" It may well be that some of these pictures are unintentionally overdrawn; representing less the real objective occurrences than they represent that utter dismay, that sense of mysterious death too swift for remedy, which severe epidemics of cholera are singularly apt to produce. But, taking them at what they are worth, what reason is there to believe that the sufferers who were so stricken down had not bowel-seizure as the ground of their collapse? No doubt the opinion has been current that cholera, acting in some mysterious way on the total organism, may "kill and leave no sign:" but in proportion as exact morbid anatomy has been cultivated, that opinion has, I think, more and more seemed to rest on a mythical basis; and the doctrine of primary collapse ought at least, without hesitation, to be rejected for cases where post-mortem examination of the bowels has not been made. In illustration of these remarks, I would refer very particularly to the important case given above at page 392 by Dr. Sutton. It was a typical case of *cholera sicca*. It was a case of cholera-death so swift that probably none of the reported "upas poisonings" were swifter. But fortunately the body was anatomised. The whole length of the small intestine was found containing choleraic effusion; and to assume in the face of that fact that the cholera-collapse was primary, would, in the present state of knowledge, be, to say the least of it, a simple *petitio principii*.

In the present state of knowledge, then, I do not find it proven, nor do I see any theoretical convenience in taking for granted, that cholera begins as an active blood-change capable of producing primary collapse. The facts, so far as I know them, can all be reconciled with the belief that cholera begins as bowel-disease, producible by direct contagion without even a passive intervention of the blood, and that all asphyctic phenomena of the disease are supervenient sympathetic phenomena. That, so far as they are facts of cardiac paralysis and arterial contraction, they may be attributed to nervous sympathy between bowels and circulatory system, without reference to the greater or less humoral effect of the coincident flux from the bowels, is at present a tenable view. At the same time I hesitate to accept as proven that cholera-collapse is independent of humoral sympathy. That it may often be apparently so is, no doubt, well shown by the statements I have quoted from Dr. Goldbaum and others. But it must be remem-

\* Virch. Arch., vol. xxvi.—J.S.

† Reichert and Du Bois Reymond's Archiv, 1864.—J.S.

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bered that in those comparative statements two most important variables are not taken into account. First, there is the varied rapidity of the local morbid process—a very considerable range of difference; and it is imaginable that the power of the intestinal flux to produce collapse may vary with the rapidity, rather than with the mere degree, in which it tends to inspissate the blood. Secondly, there is the varying susceptibility of the individual patient; and that this has range enough to account for very considerable differences of manifestation in the functions concerned in collapse will be evident to anyone who has attentively studied the very kindred subject of febrile rigors. Indeed, the power of both the variables in question may be illustrated from that analogy; for all observers know how essentially the rapidity of the thermal rise is the determining condition for the rigor; and all equally know how one patient suffers rigor to the very verge of death from influences which would not appreciably disturb another one.\*

In questioning the fact of a primary blood-poisoning in cholera, I, of course, do not intend to deny that the blood *during* cholera is poisoned. From our earliest knowledge of the disease it has been on record that, when pregnant women have cholera, the intra-uterine offspring almost invariably dies; and more recently, in proportion as the anatomy of the disease has got to be better studied, cases have accumulated, giving detailed evidence in support of an opinion which had from the first been entertained, that the infant in such cases dies of true choleraic infection. Waiving particular reference to earlier cases of this sort (for which see, for instance, Phœbus, 1833, op. cit. § 51†, and Buhl, 1856, in the famous Bavarian report) I may quote some statements made by Dr. Goldbaum in the report to which I have already referred. In the three last epidemics, he says he has carefully anatomized 22 such infants and never failed to find appearances which, collectively, he deems characteristic of cholera. "In the stomach and upper part of the small intestines always there was a fluid like rice-water, sometimes a thick mass consisting of exfoliated bowel-epithelium; the heart was always ecchymosed; at the back of the tongue there were swollen papillæ as there are in greater degree in adult cholera-corpses; and in the kidney the yellowish cortex contrasted strongly with the more blood-holding medullary substance." A case of the same sort will be found mentioned below at page 465 of Dr. Thudichum's report [A]; and I think there can be no reasonable doubt as to the meaning of any of these cases. It may, I think, be assumed for certain that the death of the fœtus is death by cholera‡, and that the fœtus is infected through its blood. And since its blood is a mere derivative of the mother's blood, the fact seems to be beyond dispute that the mother's blood had cholera-contagium in it. In relation to our main argument, however, the question is virtually unchanged. Is there any reason

\* Doubtless it is in considerations like the above that the meaning is to be sought of an assertion which I find made by Dr. Goldbaum, on the strength of some 300 post-mortem examinations, that the intestinal canal of the dead body does not in different cases show such differences of affection as to explain in any degree the greater or less severity of symptoms during life.—J.S.

† Among the cases given in Phœbus's work is one where the infant was not actually born dead, but died an hour afterwards with all symptoms of the epidemic disease.—J.S.

‡ I have been most anxious, if possible, to bring this assumption to the test of actual proof, by causing infection-experiments to be made with the intestinal contents of such cases; and I have communicated with various persons on the subject. Unfortunately the only fœtus which came within our reach was that referred to in Dr. Thudichum's report. Its intestinal contents were given to Dr. Sanderson for the purpose, and were used by him in the intended manner, but with only a negative result. The time of year had unfortunately been reached when, as he has stated, all infection-experiments failed: and therefore no conclusion whatever can be drawn from this one test of the fœtal rice-water. The general evidence, however, seems fairly conclusive as to their nature.—J.S.



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to suppose that the cholera-contagium in the mother's blood was not a secondary product of disease—was not let into her circulation from the ferment-seething interior of her bowels? In this point of view the case may be usefully illustrated by another, and closely kindred, fact. Dr. Thudichum [A] has made the important observation, that sometimes in cholera the blood, like the rice-water of the intestinal canal, contains butyric acid. He does not believe that this poisonous product of fermentation is primarily formed in the blood; he believes that it is only to be found there when, after collapse, absorption from the bowels has recommenced, and when evidently the presence of that and other like matters in the blood can be interpreted as a fact of secondary infection from the bowel.

#### EXPERIMENTS ON CHOLERA-INFECTION.

##### NOTE ON DR. BURDON SANDERSON'S REPORT.

Experiments on cholera-infection.

In supplement to Dr. Sanderson's report, I have two observations to make. First, Dr. Goldbaum, in his report on the Berlin Cholera Hospital, No. III. published in Virchow's Archiv, vol. 38, describes certain experiments performed by him, in imitation of Thiersch, on dogs and rabbits, and, as these experiments gave only negative results, concludes "that neither fresh nor decomposing cholera-evacuations are competent to produce choleraic phenomena in the lower animals." Also, in No. 44 of the Berlin *Centralblatt für die medicin. Wissenschaften*, a like conclusion is suggested by Drs. Guttman and Baginsky, on the strength of subcutaneous rice-water injections which they had practised on three rabbits and a dog. And in No. 54 of the *Centralblatt* Dr. Stockvis draws the same conclusion from a total of 43 experiments performed by him in various ways on rabbits, dogs, pigeons, frogs, and [query, how many?] mice. But wholly as regards the first two of these contradictions, and in great part as regards the third, it will be evident that the conclusion drawn is far too large for the premisses. Dr. Sanderson's experiments on dogs also gave no result; but the impotence of the agent as against one sort of animal is no disproof of its virulence against other sorts. The positive results of Thiersch's original experiments on mice, and of the experiments here reported of Drs. Sanderson and Thudichum, would retain their full value in regard of the animals experimented on even if all other animals should prove insusceptible of the influence; and that value, in explanation of the facts of human infection, is, in my opinion, conclusive. It is true that on some mice Dr. Stockvis experimented without result: apparently not on many, for he refers to the animals as unsuited for the purpose, and even intimates that they might have been left out of his account: but then it must be remembered that even the affirmative experimenters with mice did not always get positive results. I may add that Messrs. Legros and Goujon (in Robin's *Journal de l'Anat. et de la Physiol.*, 1866) quote negative results from experiments of theirs, which purported to follow Thiersch "avec une minutieuse exactitude," but which, as having been performed on rats, hardly fulfilled that description of them; for Thiersch even attaches some importance to the fact that his mice were white mice.\*

Secondly (and this is of important bearing on alleged discrepancies of experimental evidence) some very interesting questions arise as to the uniformity, or absence of uniformity, of infectant power in the choleraic contagium under varying conditions of *time* and *place*. As Prof. v. Pettenkofer has admirably argued,

\* See a recent paper by him, in vindication of his former experiments, *Zeitschr. für Biologie*, 1867, p. 128.—J.S.

and as I briefly showed in my last year's report, the unquestionable fact of the contagiousness of cholera has to be reconciled with two very important qualifications: first, that the disease, notwithstanding all its contagiouness, apparently does not, except in parts of Asia, admit of being naturalized and made habitual among populations, in the style of our ordinary current contagia; next, that, even when cholera is most epidemic in a country, there are spots where its contagium may again and again be introduced, yet again and again without result; and that while in some such spots this kind of immunity has shown itself not uniformly, but only in particular epidemics and in connexion with peculiarities of season, in other spots, and apparently from fixed conditions of soil, the immunity against the pestilence has seemed absolute. These qualifications are of incalculable importance to every truth-seeking student of cholera, and involve, of course, the hidden springs of those "caprices," which the laity deem so mysterious and inexplicable, in the localisations and periodicities of the disease. Why, for instance, was it that, in our East London epidemic, the Limehouse establishment for pauper children, standing in the midst of a gravel district, but on its own little island of brick-earth, escaped quite unharmed by the pestilence? And why was it that in Dr. Sanderson's series of experiments abundant positive results were obtained in September and October, but exclusively negative results in November? The time has not yet come for me to venture to argue the whole story of those qualifications; but provisionally I must repeat my deep sense of the value of Prof. v. Pettenkofer's researches, adverted to in my last report, both as contributing new knowledge, and as suggesting right directions for inquiry. It appears certain that henceforth no local health-officer will be properly up to the standard of his scientific duties, unless he thoroughly knows the distribution and stratification of soils in the district for which he acts, nor unless he also maintains such systematic and exact observation of the height of wells as will enable him always to speak with precision as to the movements of water-level in the soil: for it seems established that these are two great governing influences in relation to the spread of disease.

Experiments on cholera-infection.

#### TEMPERATURE IN CHOLERA.

##### NOTE ON DR. THUDICHUM'S REPORT.

It is all-important to remember that the thermometric observations recorded in this instructive section of Dr. Thudichum's report are exclusively of *external* temperature. In order to a complete understanding of the thermal phenomena of cholera, observations of this kind required to be supplemented by observations of *internal* temperature. And I therefore refer to some such, which have been elsewhere recorded.

In 40 cases of collapse treated in the London Hospital in the late epidemic temperatures were measured, simultaneously in the rectum or vagina and in the axilla, by Mr. F. M. Mackenzie, assistant resident medical officer of the hospital.\* Another important set of double observations, simultaneously external and internal, has been published in Germany (*Virch. Arch.*, Jan. 1867) by Dr. L. Güterbock, who, during the epidemic in Berlin had charge of the Cholera Hospital

Temperature in cholera.

\* Mr. Mackenzie's notes of these observations are among the interesting papers to which I have already referred as published in the last (third) volume of the London Hospital Reports. Besides his observations, others, also made in the East London epidemic, are mentioned more or less fully in the same volume: viz., a few made in the London Hospital by Messrs. McCarthy and Dove, and some made in the Wapping Cholera Hospital by Dr. Woodman and Mr. Heckford.—J.S.

Temperature  
in cholera.

No. II. The hospital, within about 10 weeks, received 820 cases of cholera; and Dr. Güterbock's published tables refer to 45 cases of collapse which terminated fatally without reaction, to 10 cases of collapse which went on without secondary disease to recovery, to 23 cases which had longer or shorter periods of secondary disease, and, finally, to 12 cases specially observed during the process of death and for some hours afterwards. He also gives a summary of numerous observations similarly made, but with exclusive reference to collapse, by Professor v. Gräfe, in the Cholera Hospital No. IV. From all the above very instructive observations, it results, in my opinion, quite conclusively that the choleraic affection of the bowels is a heat-making or "inflammatory" process; on which the development of inflammatory fever, by circulation of blood from the inflamed part, would, as a matter of course, manifestly attend, were it not that circumstances special to the disease (circumstances which in this context may be deemed accidental) suppress or circumscribe the manifestation. In a typical case of collapse the axillary thermometer shows a temperature perhaps little above F. 90°, while a thermometer in the rectum or vagina is marking a temperature high above the normal. With the superficial pulselessness of collapse before one, the suspicion cannot fail to arise that this vast difference of temperature between external and internal parts denotes mainly the failing blood-supply of the former; a state which, in so far as it does not equally affect all parts in the aortic circulation, nor even necessarily all external parts in that circulation, may not improbably be deemed to depend, to some extent, on the muscular contractility of peripheral arteries. The suspicion that the specially cold parts of the body are thus cold by reason of their anæmia, and that the anæmia is not a mere passive result of failing of heart-power, is greatly confirmed, as one observes that the differences of temperature between external and internal parts tends to be abated not only when salutary reaction occurs, but equally when the collapse is tending to a fatal termination, and then even beyond the moment of death. In some such cases, though but in few, the external parts of the body will even assume a febrile temperature. See also preceding note on collapse.

It would be of immense interest, were it possible, to know the temperature of the circulating blood, during collapse, in parts remote from the inflamed intestinal canal; to know it, for instance, as to the blood in the aorta and left side of the heart.\* It is certain that the intestinal process is of a kind to excite inflammatory fever, and it is certain that in external parts of the body febrile phenomena are (as a rule) not manifested. Is this only because their blood-supply is cut off? Or is it in any degree the index of a fallen general temperature of the blood? The question cannot at present be fully answered. Two antagonistic influences are at work, and in most cases we cannot tell which of them is predominant. On the one hand there is the calorific power of the local process, of which however a very large proportion is of course wasted in the defluxions; and on the other hand there is the general arrest of chemical processes elsewhere in the body. In some cases it seems certain that the temperature of the blood is reduced, for some-

\* The vagina, in which so many observations have been made, is of course physiologically remote enough; but its anatomical nearness to the rectum always suggests the doubt whether its high choleraic temperature is transmitted from the hot fermenting rice-water of the bowels. It deserves notice in this point of view, that, in Professor v. Gräfe's observations, the vaginal temperatures seemed higher than the rectal, which they could not have been if the vagina had got its heat from the rectum. It is true that probably the two measurements were not simultaneously made: but as against any fallacy in that respect it is recorded that *always* the vaginal temperature was the higher, and the summary of the observations even shows that the coolest vagina was warmer than the average rectum.—J.S.

times, though very rarely, even rectum and vagina are cold; but generally the great difference on which I have commented exists, and then it must be deemed a moot question whether the general temperature of the blood is not febrile.

#### SUPPOSED CHOLERA-FUNGI OF 1849, 1854, AND 1866.

##### NOTE ON DR. BUCHANAN'S ABSTRACT OF HALLIER'S RESEARCHES.

In connexion with the above account of Hallier's researches, the reader may be reminded that for a few weeks in the autumn of 1849 we in England had a good deal of talk of a so-called cholera-fungus. The notion was not then broached here for the first time; for, some eighteen months previously, Dr. Cowdell, of Dorchester, had sought to establish, on theoretical grounds, that cholera must depend on a microscopical fungus, absorbed through the lungs into the blood, and multiplying in the blood and bowels.\* Professor Mitchell, too, of Philadelphia, had advanced a similar theory:† but the special impulse to the discussion in 1849 (from the last week of September onward) was given by certain publications of Drs. Brittan and Swayne, of Bristol, in the *Medical Gazette* and *Lancet*. These writers had for some two or three months been acting in relation to cholera as a microscopical committee for the Bristol Medico-Chirurgical Society, and in their examination of choleraic discharges had, independently of one another, observed, often in very large number, certain peculiar forms ("annular bodies," "cholera cells," &c.) which they believed to form a connected series, and to be characteristic and causative of the disease. These forms, they said, were of smaller size in the vomit than in the dejections; and Dr. Brittan, stating that he had found still smaller bodies of the same sort in the atmosphere of cholera districts, put forward a note from Mr. John Quekett, then an eminent microscopist, to the effect that he, having examined Mr. Brittan's specimens, from air, vomit, and dejection, "had no hesitation" in stating that in his judgment they were successive stages of development "of the same body, which he believed to be of a fungoid nature." Dr. Budd of Bristol (*Times*, Sept. 26) added that he had found the same peculiar microscopic objects "which seem to be of the fungus tribe" "in great numbers in" "almost every specimen of drinking water which he was enabled to obtain" "from cholera-districts:" a statement which appeared particularly important in connexion with the very original and remarkable views then recently put forth by the late Dr. John Snow, in a little paper, which now has historical interest, *On the Mode of Communication of Cholera*: for Dr. Snow was contending that cholera is primarily an affection of the intestinal canal; that it is excited by the accidental swallowing of contagious matter discharged from the bowels of the sick—something which, being swallowed, can increase and multiply within the stomach and bowels; and that the great agent of such infection is drinking-water. Dr. Budd in the above quoted letter, and in a pamphlet which he soon afterwards published to the same effect, brought the various views interestingly together, and recommended, as a most important precaution, the disinfection of the discharges of the sick by receiving them "into some chemical fluid known to be fatal to the fungus tribe."

Thus far the story reads as if the recent observations of Thomé, Klob and Hallier, had in substance been anticipated in England nearly 20 years ago. On fuller inquiry, however, this does not seem to have been the case; and indeed the greatest doubt must be felt whether the appearances insisted on by the

\* Disquisition on Pestilential Cholera: London, 1848.—J.S.

† On the Cryptogamous Origin of Malarious and Epidemic Fevers: Philadelphia, 1849.—J.S.



Supposed  
cholera-fungi.

Bristol observers of 1849 can in any degree claim kindred with those which are now under discussion. For within a month of the publication of the alleged discovery of 1849, the whole statement of facts was put in a totally different light by a report made on the subject to the College of Physicians, by the late Dr. Baly and Dr. Gull, with valuable assistance from Mr. John Marshall, and also by the testimony of various independent writers. Drs. Baly and Gull ended their report with the following conclusions: "Bodies presenting the characteristic forms of the so-called cholera-fungi are not to be detected in the air, and as far as our experiments have gone, not in the drinking water of infected places. It is established that, under the term 'annular bodies' and 'cholera cells or fungi,' there have been confounded many objects of various and totally distinct natures. A large number of these have been traced to substances taken as food or medicine. The origin of others is still doubtful, but these are clearly not fungi. All the more remarkable forms are to be detected in the intestinal evacuations of persons labouring under diseases totally different in their nature from cholera. Lastly, we draw from these premisses the general conclusion that the bodies found and described by Messrs. Brittan and Swayne are not the cause of cholera, and have no exclusive connexion with that disease, or, in other words, that the whole theory of the disease which has recently been propounded is erroneous, as far as it is based on the existence of the bodies in question." Dr. Swayne, it is true, protested against the conclusions of the report, and against other criticisms which had been written on the Bristol observations: *Lancet*, pp. 530-2: but practically no advance had been made on Dr. Cowdell's theory of the year before: for it was certain that the appearances originally described had been of the most heterogeneous variety, and nothing like proof had been offered that even any of the alleged specific forms were fungic. The general verdict of 1849 seems finally to have been accepted by the observers themselves; for, from then to the present time, though cholera has again more than once been epidemic in England, they have not, so far as I know, ever re-opened the discussion.

Hallier (citing the Bristol observations only through the notice of them which is contained in Robin's *Végét. Parasit.* pp. 676-80) supposes that the spore-cysts which he now describes were seen at Bristol in 1849. But after going in detail through the descriptions of that period, I find myself quite unable to identify his spore cysts either with the large "annular bodies" which Drs. Brittan and Swayne described, or with the large "cholera-cells" for which Dr. Swayne alone was responsible: and of no other of the alleged cholera forms of 1849 can there in the present context be question.\* I may add that the

\* The large "annular bodies" of the two observers had a "peculiar cupped appearance," an "unmistakable appearance of being surrounded by a thick wall, a sharp irregular fracture, the morsels presenting in some measure the same characteristic annulus as the parent cell did." Drs. Baly and Gull spoke of these bodies as "discs with thick, elevated and somewhat irregularly curved margins, the central area flattened and obscurely granular;" Dr. Griffith afterwards spoke of them as "structureless discs;" they were declared by Mr. Marshall to be soluble, some entirely, some almost entirely, in ether, and to be imitable with finely-divided cheese brought with ether under the microscope; also, whatever may have been their nature, they were affirmed by Drs. Jenner, Baly, and Gull to have been seen by them respectively in the discharges of typhoid fever and dysentery, as well as under various other circumstances. Dr. Swayne's large "cholera-cell" was "more than twelve times as large" as the spores of uredo caries; had a thick and commonly much laminated wall; was "met with of all sizes and in every stage of development," was "covered somewhat irregularly with blunt projections or buds;" contained "within it a round granular mass which does not quite fill its interior;" and nitric acid, which "has

Supposed  
cholera-fungi.

Rev. M. J. Berkeley, who is still, as he was in 1849, the first of our mycological authorities, and to whom in 1849 many specimens of cholera discharge were referred, for mycological criticism, by the Bristol observers and others, has done me the favour of looking for me at Hallier's illustrations, and informs me that the "annular bodies" and "cholera cells" which were brought under his notice in 1849 were quite dissimilar from the spore-cysts which are now brought under discussion, and that the latter are now seen by him for the first time. Mr. Berkeley also draws my attention to the resemblance of Hallier's spore-cysts to some of those which were represented by himself, in the *Journal Linn. Soc.*, 1864, as belonging to the fructification of *chionyphe Carteri*.

A reference which in the present context seems to me to be far more important than any in the literature of 1848-9, and which I am surprised not to see prominently made by the present German observers, is to Boehm's observations of 1838.\* If the doctrine of a cholera-fungus should hereafter be substantiated it will probably be conceded that Boehm deserves the credit of having first published a thoroughly valid account of phenomena of cryptogamic vegetation in choleraic intestines and discharges, and that Hallier's researches do not better join on to the recent essays of Thomé and Klob, than they might have joined in 1838 on to those of Boehm. The fifth section of his admirable little book is entitled *Ueber das Vorkommen der Gährungskeime (Pilze) im Nahrungs-kanal der Cholera-kranken*. In it he describes, as almost constant, that the whole extent of the intestine (but generally the large intestine least) teems with a vegetation of microfungi: that innumerable round and oval, or more elongated, corpuscles are to be found in all the vomit and dejections, as well as in the canal; sometimes single, sometimes two, three, four or more, joined end to end, as links of a chain; and these chainlets sometimes branching; that such forms are held together in mucous floccules, and come best to light when liquor potassæ is used; that within the small intestine they are often so numerous that not the smallest specimen will fail to show numbers of roundish fungic forms amid the debris of epithelium. He appends an illustration which shows quite unquestionably the forms of cryptogamic growth, and refers, for similar forms, to Schwann's then recently published investigations of yeast.

From 1838 till 1866 cryptogamic forms like these seem almost never to have been particularly observed. It is doubtful whether in 1849 they formed an undistinguished part of the miscellaneous phenomena at Bristol: but Mr. Marshall† and Mr. Berkeley‡ seem, without attaching the least importance to the fact, sometimes to have seen them. A passing allusion to such forms, as

"no action on the uredo beyond rendering it rather paler, slowly dissolves the cholera-cell, first turning it a bright yellow colour, then resolving its granular contents into three or four oily-looking globules, and finally reducing its wall to a very thin pellicle with scarcely a trace of buds." Probably the latter bodies may best be identified for purposes of mycological comparison by reference to the description of them which was given, in that point of view, by the Rev. M. J. Berkeley, in the *Medical Gazette* of Dec. 14, 1849; but it seems conclusive to observe that Mr. Berkeley did not identify the "cholera-cells" as forms of cryptogamic vegetation, which assuredly he would have done if they had been such spore-cysts as Hallier represents. Any one who may wish to compare for himself the representations of 1849 with those now put forth by Hallier, will probably find that, for that purpose, some plates which were published in the *London Journal of Medicine*, 1849, from etchings by Dr. Swayne, are better (as being more finely executed) than the woodcuts of the weekly journals of the time.—J.S.

\* Die kranke Schleimhaut in der asiatischen Cholera: Berlin, 1838.—J.S.

† See Report of Drs. Baly and Gull, p. 18, and Mr. Marshall's letter appended to it, particularly at page 27.—J.S.

‡ In paper, above referred to, in *Med. Gaz.*, 1849.—J.S.



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of no particular importance, was made in relation to the Berlin epidemic of 1848 by Drs. Reinhardt and Leubuscher,\* as afterwards in relation to the Bavarian epidemic of 1854, by Dr. Buhl.† In 1854 in London Dr. Hassall, after examining for the then General Board of Health "about 25" specimens of rice-water discharge, stated very definitely that "in none of the samples "were sporules or threads of any species of fungus present."‡

An interesting reference in the present point of view is to the writings of Professor Pacini of Florence; for this accomplished observer, on various occasions from 1854 to the present time, has described the choleraic process as consisting primarily in a destruction of the epithelium and villi of the intestines by an infiltrative vibrional development, and has argued that these vibriones and their germs—molecules of less than  $\frac{1}{35000}$  of an inch in diameter, poured forth in millions in the discharges of the sick, must constitute the contagium of cholera.§ It seems possible that the difference between the *molecule vibrionali* of Pacini and the respective micrococci and spores of Hallier, Klob and Thomé, may really be only a difference of name. Not only Pacini, but many other observers whose microscopical examinations have been carefully conducted, have also mentioned with more or less stress the abundance of what they have called "vibriones" in the choleraic discharges. For instance Dr. Hassall, after making the statement which I have just quoted as to the forms commonly recognised as fungic, adds: "Myriads of vibriones were detected in every "drop of every sample of rice-water discharge hitherto subjected to examination. "Of these vibriones many formed threads more or less twisted, while others "were aggregated into masses which under the microscope presented a dotted "appearance." I may remark, too, that the microscopical observations made in England during 1866, though they have not reinstated any of the fungi of 1849, or brought to light any figures resembling the spore-cysts of Hallier, are not without interest in relation to the questions here under discussion. Thus, I would particularly refer to the few remarks made by Dr. Sanderson and Dr. Bristowe respectively [A] on the abundance of microscopical life which they found in the choleraic secretions of infected lower animals. And in the same point of view I would refer to Dr. Beale's papers in the *Med. Times and Gazette*, especially to that of August 18th, as representing, though with different nomenclature and different interpretation, much such an invasion of bowel epithelium by low organic forms as that which the German observers insist upon.||

Though I have thought it desirable for the scientific purposes of my report to advert very particularly to such statements as those which are mentioned in this portion of my appendix, I do not now venture to submit anything like a judgment on the very difficult eventual question which they seem to open. It appears to me that, before this can be done, not only the mere *biorama* (if I may so call it) of the intestinal contents, healthy as well as choleraic, will have to be studied far more extensively than it has yet been, and in all its accidental

\* In Virchow u. Reinh. Archiv, vol. 2, p. 414.—J.S.

† In Hauptbericht über die Cho.-Epid. d. Jahres 1854, pp. 504-6.—J.S.

‡ Appendix to Report of Committee for Scientific Inquiries, pp. 289-90.—J.S.

§ See Betti's *Considerazioni sul Colera Asiatico in Toscana*; Florence, 1858; vol. 5 pp. 333-334. Also Pacini's separate works: *sulla causa specifica del Col. Asiat.*, Florence, 1865, and *della natura del Col. Asiat.*, Florence, 1866.—J.S.

|| It deserves notice that Drs. Beale, Bristowe, and Sanderson, whom I believe to be three of the most trustworthy of observers, all (like Drs. Klob and Thomé) insist upon the active movements of the organic forms which they respectively describe, while Hallier apparently says that the minutest forms in his mycogony show none but passive movements.—J.S.

variations, but also that, in the general study of zymoses, no doubt must remain as to the ætiological significance of the low organic forms which attend the chemical transformation. It strikes me as of the utmost importance, scientific and practical, that investigations should now be vigorously pressed in both of the directions adverted to. It may not be irrelevant to remark that, equally for eye and hand and intellect, such are among the most difficult of studies; that they form a very special branch of work hitherto but little cultivated among medical practitioners in this country; and that the temptation to generalise as to them from some small field of observation is one which ought peculiarly to be resisted. The possibilities of error are numberless. Pacini quotes from Bloch a very graphic expression of the truth in calling this field of study the "infusorial "chaos" of the intestines. *Omne ignotum pro fungo* is of course a view less likely to be accepted in the present state of mycology than it may have been some 20 years ago: but any unpractised observer, going to work over-confidently in that "chaos," can scarcely fail to be a finder of mares' nests.

Finally, as regards Hallier's interesting reference to Dr. Tytler's doctrine of the origin of cholera in India, I may state that Dr. Tytler's views were published by him in London in 1833 in a pamphlet of 60 pages (long since out of print) entitled *Facts establishing the Deleterious Properties of Rice as an Article of Food*. Dr. Tytler's statements at the time excited very considerable interest, and were much discussed in medical societies and elsewhere. A very ample account, both of his statements and of the discussions which arose on them, may be read in Vol. I. of the *Lancet* for 1833-4.

### From the Tenth Report to the Privy Council, 1867.

[The Tenth Report comprises sections relating to the Administration of the Diseases Prevention Act; the Regulation and Superintendence of Public Vaccination, which is omitted from the reprint, *vide* Vol. I., p. 370. The chief part of the report is that which treats of the inquiries, *Occasional* and *Systematic*, conducted in 1867. The portion of the report devoted to the *Systematic* inquiries comprises sections on the Distribution of Disease in England, and Particular Processes of Disease Investigated in Scientific Detail.—Ed.]

### THE ADMINISTRATION OF THE DISEASES PREVENTION ACT.

The Diseases Prevention Act, which in the summer of 1866 had been put in force by Her Majesty's Government on Administration of the Diseases Prevention Act.

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account of the diffusion of Asiatic Cholera in England, was kept in operation throughout the whole year 1867 by successive Acts of the same authority; and my Lords of the Council, on each of the half-yearly occasions when the Act was ordered to continue in force, provided that also the Medical Relief Regulations of 1866 (as given in the Appendix to my last annual Report) should continue. Those Regulations, for their first issue, had been carefully so constructed that their renewal from time to time should not make any further claim on local authorities for trouble or expense, except in so far as new outbreaks of cholera might arise; and, subject to this condition, it appeared better that the Regulations should continue in force, ready for immediate application to any such outbreak, than that risk should be run of emergencies perhaps to arise after their lapse. Fortunately the year 1867 passed without any noticeable repetition of the epidemic experience of 1866. In this state of the case a further continuance of the Regulations seemed unnecessary, and at the date of my present writing the Diseases Prevention Act has ceased to be in force.

#### INQUIRIES AND ACTION IN OTHER MATTERS.

The proceedings of the Lords of the Council in 1867, in that general relation to the interests of the Public Health in which the Act of 1858 appoints their Lordships to stand, were, as usually, of two sorts. In the first place there were proceedings of an essentially *occasional* sort, with reference to particular outbreaks or threatenings of disease during the year, or to particular complaints which had been made of dangerous nuisance in various parts of the country; and in the second place, there were proceedings of an essentially *systematic* sort, forming part of a plan of work which goes on connectedly from year to year. And of these two sorts of proceedings the following were the main facts.

#### 1. *Occasional Proceedings.*

On numerous particular occasions where complaints of the state of districts were made, or where outbreaks of endemic disease had occurred or were apprehended, my Lords during the year had correspondence, which was for the most part with local authorities, with regard to the administration of the Nuisances Removal and other common sanitary Acts. The authorities thus corresponded with were 113; including the 76 nuisance authorities of Wales, 10 of the vestries and district boards of the metropolis, 10 boards under the Local Government Act, and 14 boards of guardians. Occasional Inquiries.

In three of these cases, namely, in regard of Winterton in Lincolnshire, Guildford in Surrey, and Terling in Essex, local inquiry by an Inspector under their Lordships' direction was deemed necessary: these being the chief cases in which in 1867 a prevalence of typhoid fever constituted the matter of complaint. All three cases were in substance such as I have again and again reported on, as illustrations of excremental poisoning; and this filthiest chapter in the history of our pestilences is one which I would gladly consider myself exonerated from re-opening on the present occasion. As regards those for whom primarily my Reports are written—the makers and administrators and officers of sanitary law in England, it may seem superfluous that I again proceed to illustrate in some detail the dependence of typhoid fever on conditions which it is disgusting to specify. But while the evil continues—while annually in England some fifteen to twenty thousand persons are killed, and perhaps twenty times that number grievously sickened and endangered, by a disease which solely prevails through the pollution of atmosphere and drinking-water with excrement, the subject could not properly be set aside, unless Legislature and Government had already quite exhausted their powers in fruitless endeavours against the evil. I venture to believe that such is not the case; and purposing presently to invite judgment on this question, I shall briefly state here the leading facts of each of the three epidemics.



Typhoid fever  
in Winterton.

(i.) The little town of WINTERTON in Lincolnshire, having a population of about 1,800 persons, had for the last seven years been almost always suffering more or less from the presence of typhoid fever, and for the last two or three years the disease had been of great local importance. Sometimes it was more in one part of the town, sometimes more in another. In 1865-6 it particularly attacked a group of 35 houses at the west end of the town; and here, within the twelve months, out of 145 inhabitants 100 contracted the fever, and 17 died of it; or, in other words, those 145 inhabitants suffered in that year from the one preventable disease as many deaths as a population *seven times as great*, in fair sanitary circumstances, is expected to suffer *from all diseases and accidents put together*. Early in 1867 typhoid fever was again prevailing in large proportions in Winterton, but chiefly in another part of the town; and when their Lordships' inspector was there in April, there had been 55 new cases, and among them already 6 deaths. The cause of all this terrible sickness and mortality was of course evident to their Lordships' inspector at a glance. It was the merest question of filth. "The epidemic prevalence of fever in Winterton," he writes, "is undoubtedly to be ascribed to the disgraceful state of the privies, cesspools, ashpits, and wells. . . . Given, the existence of typhoid fever in a town, it is hardly possible to conceive conditions more favourable for its spread than these existing at Winterton." Extracts which I append from his Report [A] contain copious details in support of the above conclusion. The conditions described are such as probably even the swine in the town may have suffered from; and it deserves notice that the scene of this disgraceful sanitary neglect was a town which four years previously had adopted the Local Government Act.

Typhoid fever  
in Guildford.

(ii.) The epidemic of typhoid fever at GUILDFORD was peculiarly instructive. Guildford is not ordinarily quite exempt from typhoid fever; and, during the first twenty-eight days of last August, 10 such cases had been seen scattered about in the town; when suddenly within the next thirty-three days there had arisen fully 250 cases of

Typhoid fever  
in Guildford.

the disease, and of this large number 150 had arisen within a fortnight. The distribution of the disease, especially during the first fortnight of the epidemic, so nearly corresponded in area with a particular section of the public water-supply of the town as to raise the strongest suspicions that this section of the water-supply was at fault. And eventually these suspicions became a certainty. First, namely, it was shown that on one particular day in August (about ten days before the beginning of the outbreak) 330 of the 1,675 houses of Guildford had *exceptionally* received their water from a certain high-service reservoir which had been previously filled from a new well; and that the persons residing in or frequenting these 330 houses constituted the part of the population on which the epidemic influence had almost exclusively fallen. Subsequent chemical examination of the water of the new well detected in it the products of organic decomposition; and examination of the local circumstances showed, but too unquestionably, whence the decomposing organic matter had been derived. The new well, no one could doubt, was most dangerously situated: in the porous and fissured chalk-stratum, it was within ten feet of various sewers; one of which indeed was traversed, as a short cut, by the iron delivery-pipe of the high service. And when, after the epidemic, this reckless confusion of sewer and water-works was dissected, the state of things found at the spot, was reported to us in the following terms by Mr. Taylor, one of the Poor Law Medical Officers of the town:—"The engineers employed in the repairs of the steam engine noticed some exudation on the wall of the engine-house next the alley where the sewer runs, and the pit of the fly-wheel contained a notable quantity of the same. As the exudation had the smell of sewage, the ground was opened in the alley at a point adjacent to the engine-house. The sewer was found leaking in various places, and the soil between it and the wall of the engine-house was saturated with sewage, of which as much appeared to run outside as inside the sewer. This was found to be an old-fashioned 12-inch drain constructed with red unglazed gutter tiles, with butt joints and common mortar. The



Typhoid fever  
in Guildford.

" tiles forming the lower half of the cylinder were in places  
" completely worn away, and at one point several feet of  
" them were missing, and the upper tiles had fallen in upon  
" the soil below. All the joints gave exit to water, and the  
" ground was a quagmire of filth beneath and on each side.  
" Dark coloured fetid slush had to be dug out and removed  
" in baskets, making the men vomit who were employed in  
" the work."—There of course could not be any reasonable  
doubt but that the passage of this filth into the well, from  
which the high-service reservoir was filled, had been the  
cause of the epidemic. Mr. Taylor further informed us that  
the whole number of deaths from fever up to the end of the  
epidemic was 21, including three or four who died in other  
districts after removal from Guildford; and that he roughly  
computed the total number of cases of fever from August to  
December at 500.

Typhoid fever  
in Terling.

(iii.) The epidemic at TERLING, in Essex, was one of extra-  
ordinary dimensions. In that village of only 900 inhabitants,  
and for the most part within a period of two months, fully  
300 persons were attacked with typhoid fever, and 41 of the  
number died. That is to say, the one preventable disease  
killed in that short time a larger proportion of the population  
than all causes of death put together ought to have killed  
there in two years. The conditions which rendered possible  
this most calamitous visitation of disease were, as in all our  
other experience, conditions of local filth. At Terling such  
conditions were at their worst. Round what pretends to be  
the house-accommodation of the tillers of the soil in Terling  
(a scanty overcrowded supply of dwellings of the meanest  
description) every possible source of pollution for air and  
water was accumulated; the peculiarly porous soil which  
underlay all this filth was of course continuously absorbing  
it; the water-supply of the population was derived from  
wells, most of them sunk in that excrement-sodden sponge  
of earth; some ten days before the outbreak of the fever,  
after an extraordinary period of drought, a sudden great rise  
in the water-level of the wells was observed; and this of  
course denoted a long-delayed scouring of that foulest soil  
into the water-supply of the now poisoned population. The

epidemic incidentally deserved and received, for ulterior reasons, very particular scientific investigation; but my reference to it in this place is exclusively for practical purposes. The filth which did so enormous an injury to human life, existed under definite legal responsibility. The Nuisance Authority of the place (the Board of Guardians of the Witham Union) had most grossly neglected its duty. My Lords, in deference to what they believe to be the intentions of the Legislature, felt themselves bound to allow the Local Authority very ample opportunity even for tardy action; but when it became obvious to them that no sufficient use was being made of this opportunity, and that to spend further time in remonstrating with the Board of Guardians would not consist with due regard to human life in the district, their Lordships judged it necessary to move Mr. Secretary Hardy to put in force the compulsory provisions (Sections 16 and 49) of the Sanitary Act, 1866.

I have already intimated that except for an immediate practical purpose I should not have thought it necessary again to give in one of my annual reports such extremely disgusting details as are here stated (partly in my last paragraphs, and still more fully in the appended reports of the inspectors) with regard to the local circumstances of our three chief fever-epidemics of 1867. But I have to raise a question which seems to me of the very utmost importance for the future sanitary progress of the country. And for the purpose of my argument I must refer to those three cases as types. They illustrate perfectly, but without any trace of exaggeration, the circumstances under which alone Typhoid Fever is empowered annually to kill so many thousands of our population, and to prostrate for months at a time so many scores of other thousands. Nor is this all. When cholera from time to time is among us, and its victims, during the short while of its prevalence, are counted in quick-succeeding thousands, like the slain and wounded of great battles, the circumstances of that pestilence are the same. The laws of its contagion in this country are substantially the laws of the fever-contagion: always there is

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State of the law as to compensation of persons injured under the Nuisances Acts, &c.

the one story of filth: "excrement-sodden earth, excrement-reeking air, excrement-tainted water, these are for us the "Causes of Cholera."\* Now the point which I to some extent raised in my last report, as concerning the legal responsibilities of malfeasant water companies, is one to which I cannot but revert in connexion with our late Guildford experience: though now under slightly different circumstances, for on this particular occasion, as it happens, the water was purveyed by a local board. But the question which I am anxious now to raise is of very much larger scope than that formerly touched upon. It seems to me that the time has now come, when, not only as regards commercial water-companies, but also as regards local sanitary authorities, certain sorts of malfeasance should involve an obvious and unquestionable liability to pay pecuniary damages to persons whom the malfeasance has injured. I am not qualified to say that some liability to this effect may not at present be latent in our law: but I believe that at least it has never hitherto been judicially defined or affirmed: and it is evident that in this state of the case years may elapse before any aggrieved person, unless unusually rich and public-spirited, will be willing to incur considerable legal costs in testing his so doubtful claim to redress. I venture to submit that in this point of view the sanitary rights of the public are but very imperfectly secured, and that explicit legislation in the matter seems to me greatly to be desired. The effect of such legislation would be that what I may call *the fixed and finished parts* of sanitary science, as distinguished from those which are in any degree uncertain and speculative, would very rapidly become ordinary rules of conduct in civil life. In cases of alleged sanitary wrong, courts of law would have the facts in evidence before them; and judges and juries would determine whether wrong (in legal sense) had been done, and would assess the pecuniary damages in proportion. I would invite attention, in this point of view, to the three cases which are above reported. Apart from legal subtleties, on which I am not competent to speak, it seems that the

\* Extracts from Ninth report, p. 296.

distribution of fouled water by the Guildford Board (regarded for the moment as a water-company) is as proper a case for judge and jury, on action for damages by any of the 500 people who had typhoid fever in the town, as any case in which a railway-collision brings some scores of passengers into harm; and the fact (as I believe it to be) that these water purveyors gave typhoid fever to their customers would be brought home to their consciences, and be suggested as a warning to other water-purveyors, in a far more conclusive and effective manner by such legal proceedings as I suggest, than it can be by any departmental statistics and remonstrances. Again, as regards the epidemics at Winterton and Terling:—under 29 & 30 Vict., c. 90, sect. 20, it is expressly the duty of certain local authorities that they make from time to time (personally or by their officers) inspection of their districts, with a view to ascertain what nuisances exist calling for abatement, and that they enforce, in regard of such nuisances, the provisions of the Nuisance Removal Acts. If cases like those of Winterton and Terling were before a court of law, and the propositions were affirmed (as I apprehend they unquestionably must be) that the duty of the authority had been utterly neglected, and that the sufferings of the population, or of parts of the population, had resulted from the neglect, "injury," in that legal sense which implies a title to redress, would have been done by the authority; and if hereupon each person who had suffered as above could recover his compensation from the rates, local authorities would immediately have the knowledge conveyed to them, in a far more practical form than it has yet assumed in their eyes, that sanitary neglect is a mistaken parsimony.

Apart from legal technicalities, on which I do not pretend to enter, the desiderata seem to me to be these three:—first, that for any purveyor of water wilfully or neglectfully to distribute foul water, or, where filtering is required, unfiltered water, and for any local authority to make default in such duties in relation to the public health as are by statute expressly imposed on it, should be (if they be not

State of the law as to compensation of persons injured under the Nuisances Acts, &c.



State of the law as to compensation of persons injured under the Nuisances Acts, &c.

already) indictable offences, and that the production of disease by offences as aforesaid should be also (if it be not already) indictable; secondly, that it should be the province of some named central authority to take at its discretion legal proceedings against offenders as above; and, thirdly, that where such proceedings had led to conviction, all propositions affirmed in the verdict as to the causing of disease by the convicted person or authority at the time and place in question should afterwards be held proven for the purposes of whatever civil actions for damages might then be brought by private persons on account of injury sustained through the disease. It would of course in any action for damages be matter for question and proof whether the particular suffering had resulted wholly or in part from private fault, either in resistance to a local authority or otherwise; but looking to the spirit of our present nuisance-laws, especially to section 20 of the Act of 1866, I apprehend that nuisances on private premises could not *primâ facie* be deemed matters of solely private responsibility; and in regard of a large class of such cases, it may be doubtful whether an authority could quite exonerate itself of responsibility for the nuisances, even as against the owner of the premises, unless it showed that it had taken all proceedings required of it by law in such matters, or at least that the district possessed all proper facilities for the abatement of private nuisances. As regards such indictments as are above proposed, in which generally the indictment would be only for ulterior purposes, and the proceedings therefore only nominally penal, precedent exists in the indictability of parishes or other responsible parties for omissions to repair highways and bridges.

## 2.—Systematic Proceedings.

Systematic Inquiries.

The continuation of the systematic work which was previously in progress in the department, with the object of increasing our exact knowledge of diseases, involved during 1867 some studies which were in the highest degree interesting and important. These studies were of two different sorts, which it will be convenient here to distinguish.

## DISTRIBUTION OF DISEASE IN ENGLAND, AND THE CIRCUMSTANCES BY WHICH IT IS REGULATED.

I have to recall that in my last annual report a section to which I attached particular importance related to changes <sup>Dampness of soil.</sup> produced in the public health in certain towns where of late years improvements in drainage and water-supply had been made. The largest result of the investigation then reported on (an investigation relating to 25 towns, with an aggregate population of 600,000 inhabitants) was to show very strikingly the exemption which local populations obtain from cholera, typhoid fever, and other endemic bowel affections, in proportion as the local air and soil and water are kept free from excremental pollution: a result so confirmatory of much other evidence previously collected in regard of the same ætiological question, that henceforth apparently not even the most unwilling witness can deny the relation of cause and effect in that matter. But the inquiry had also some other results, of different degrees of value. And among such results one which stood in particular relief concerned the local distribution of PULMONARY PHTHISIS.

It was evident, namely, that in some of the towns which <sup>Relation of phthisis to dampness of soil.</sup> had been improved the mortality from Phthisis had notably diminished. And when detailed examination was made of the cases which gave that indication, in contrast with the different class where phthisis had not been lessened in amount, it appeared that the diminution or non-diminution of phthisis depended on whether the sanitary improvements of the place had, or had not, included any considerable drying of the soil. In cases where this condition had been fulfilled, the reduction of phthisis occurred both too uniformly, and also in too great amount, to be regarded as of accidental coincidence. In a table then given, the reduction on previous phthisis-mortality, for the first 15 towns spoken of, was shown to be such as I now re-state in the adjoining table. And the fact that in some of the cases the diminished fatality of phthisis was by far the largest amendment, if not the only one, which had taken place in the local health, became extremely interesting



Relation of  
phthisis to  
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soil.

and significant, when the circumstance was remembered that works of sewerage, by which the drying of soil is effected, must always of necessity precede, and do indeed sometimes precede by years, the accomplishment of other objects (house drainage, abolition of cesspools, and so forth) on which the cessation of various other diseases is dependent. Thus, as regards the two largest populations which were reported on—those of Bristol and Leicester, no doubt the comparative smallness of effect hitherto produced on the general and diarrhoeal death-rates of those towns might (so far as it was not fallacious) be referred to the shortness of time for which finished constructions had been at work for the detailed depollution of houses and their dependencies; but a reduction already of a sixth in the phthisis-mortality of Bristol, and a reduction already of a fourth in the phthisis-mortality of Leicester, were apparently connected with the fact that in both towns main sewerage on a large scale, with more or less drying of soil, had existed, in comparison, for many years. And Rugby, which, long as it had been at work, had not yet succeeded in getting rid of endemic diarrhoea and typhoid fever, showed at least this result of its main drainage works, that its phthisis-mortality had fallen 43 per cent.

The above facts, though not enough in themselves to prove as certain the very important ætiological relation which they suggested, were at least amply sufficient to show that a very promising line of inquiry had been opened. And my Lords having on my representation been pleased to direct that this should be continued, Dr. Buchanan, the practised and skilful

The death-rates by PHTHISIS in the 15 under-mentioned towns had, after improved land-drainage, fallen, *per centum* as follows:—

SALISBURY -	-	-	-	49
ELY -	-	-	-	47
RUGBY -	-	-	-	43
BANBURY -	-	-	-	41
WORTHING -	-	-	-	36
LEICESTER -	-	-	-	32
NEWPORT -	-	-	-	32
MACCLESFIELD -	-	-	-	31
CHEL TENHAM -	-	-	-	26
BRISTOL -	-	-	-	22
DOVER -	-	-	-	20
WARWICK -	-	-	-	19
CROYDON -	-	-	-	17
CARDIFF -	-	-	-	17
MERTHYR -	-	-	-	11

inspector who was engaged on the former general investigation, has now given me a further report of results obtained by him in a subsequent special research. That report presents an elaborate examination of the distribution of phthisis, as compared with variations of soil, in the three south-eastern counties of England, beyond the limits of the metropolis; and it confirms, I think, beyond any possibility of question, the conclusion, previously suggested, that *dampness of soil is an important cause of phthisis to the population living upon the soil.*

This conclusion, so far as it rests on the above evidence, cannot, strictly speaking, claim to be proven for any other countries than our own; and a supposition might be advanced, though of course with little probability, that perhaps we had only succeeded in discovering an influence special to England. It is therefore with much interest that I am able to quote the result of an inquiry (which indeed was made long before our own, though it has only recently come to my knowledge) on the distribution of Phthisis in some of the United States of America. It appears that in 1862, in an address delivered at the annual meeting of the Massachusetts Medical Society, and afterwards published, Dr. Bowditch, of Boston, U.S., drew attention, and not for the first time, to the remarkable inequality with which he had found phthisis to be distributed in Massachusetts, and, so far as he could ascertain, elsewhere in the States, and to the connexion of this inequality with differences of moisture of soil. He represented that “medical opinion in Massachusetts, as deduced from the written statements of resident physicians in 183 towns, tends strongly to prove, though perhaps not affording perfect proof of, the existence of a law in the development of consumption in Massachusetts, which law has for its central idea, that dampness of the soil of any township or locality is intimately connected, and probably as cause and effect, with the prevalence of consumption in that township or locality;” and he also adduced particular instances as tending to prove that even “some houses may become the foci of consumption, when others but slightly removed from

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phthisis to  
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Relation of  
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"them, but on a drier soil, almost wholly escape."\* It is moreover well worthy of notice that the Registrar General of Scotland in his 7th Annual Report, advertizing to Dr. Bowditch's work, has stated that, in his opinion, the mortuary statistics of phthisis in Scotland furnish evidence to the same general effect. With those corroborative statements in aid of the evidence which this department has collected, it must, I think, be deemed extremely probable that the influence of soil is universal. But at any rate as regards England, of which alone I have officially to speak, the conclusion as to the influence seems indisputable.

Causes and  
preventability  
of phthisis.

In submitting this conclusion as one which, in my opinion, must henceforth stand among those scientific certainties on which the practice of preventive medicine has to rest, I take the opportunity of observing (though perhaps almost superfluously) that the conclusion does not purport to be more than a contribution to the ætiology of phthisis. That vastly fatal disease, if we are to have proper knowledge of its causes, must be studied from many different points of view. On former occasions (as particularly in my 4th and 6th annual reports) I have brought into relief the industrial relations of the disease, and now I insist on its occasional endemic relations. On those previous occasions it was shown to be a disease which undergoes development in proportion as men are *unwholesomely gathered in indoor industries*: now it is shown to be a disease which also develops itself in proportion as men are *dwelling upon a humid soil*. These two conclusions, no doubt, are very great ætiological fragments; but even when taken together they do not pretend to exhaust, or nearly to exhaust, the subject of the causation of phthisis. Thus, it may suffice me in passing to note that our studies of the disease have not yet touched its immensely important *hereditary relations*. And even in the present volume I shall

\* My quotations of Dr. Bowditch's work are from a second edition, which has quite recently been published in America:—"Consumption in New England and elsewhere, or Soil-Moisture one of its chief causes;" Boston, 1868. We here, as Dr. Buchanan states, had been entirely unable to obtain a copy of the original work; and the copy of the re-issue, which I owe to Dr. Bowditch's kindness, has reached me only since the completion of Dr. Buchanan's report.—J.S.

Causes and  
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directly have to bring under consideration another and entirely different aspect of the disease—that, namely, in which its intimate pathological affinities have to be discussed, and the *nature of the morbid process* which establishes it. That in both those directions the acquisition of further knowledge may very greatly increase our power of preventing a disease which now causes in England probably at least an eighth part of the entire mortality, will not, I think, seem improbable to anyone who well considers the subject; but meanwhile I may point with great satisfaction to the eminently practical character of the conclusions already obtained. Phthisis, so far as it depends on unwholesome circumstances of indoor industry, has, since my former reports, been made preventable under the law;\* and phthisis, so far as it depends on wetness of soil, may easily in great part be made similarly preventable.

Distinction must, of course, here be drawn between populous and non-populous places. An undrained state of soil in any place where population is aggregated answers to the legal intention of the word "nuisance;" and I apprehend that, even in the present state of the law, the local sewer-authority is bound to provide that such a state shall not continue through want of proper constructions for the drainage. For agricultural lands, no doubt, the case is different. It may not be practicable to require that such lands, though damp enough to cause phthisis to the comparatively few and scattered persons who reside on them, shall be artificially drained by their owners; and the interests of agriculture in this respect are not always identical with those of human salubrity. But at least the law might unequivocally condemn, so far as detrimental to health, all damming of natural drainage. And for river-conservancies it would be a function, scarcely if at all less important than that of preventing the pollution of rivers, that they should also, as far as possible, prevent or remedy all such artificial and natural obstructions of water-flow as keep tracts of inhabited land sodden with stagnant wetness.

\* See Factory Acts of 1864-7, Work-places Regulation Act of 1867, and section 19 of the Sanitary Act, 1867.—J.S.

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scPARTICULAR PROCESSES OF DISEASE INVESTIGATED IN  
SCIENTIFIC DETAIL.Investigation  
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Disease.

A very important branch of the systematic work of the department is represented for 1867 by the last two papers of my subjoined appendix [A], by Dr. Sanderson and Dr. Thudichum respectively. In my eighth report (pp. 215-8) I have stated the circumstances under which my Lords, early in 1865, determined that in future there should to a limited extent be conducted under their auspices such investigations in abstract pathology as might seem likeliest to be of ulterior effect in the more immediately practical and popular objects of this Department. The present is a time of the most extraordinary transition and progress in the sciences which are fundamental to medicine; so much so, that scarcely a month passes without raising some new pathological question which bears upon principles of action; and this Department, practically considered, would be lagging far behind the knowledge which ought to be represented in its administration, and might often be spreading mere obsolete error among persons who look to it for intelligence, if it were not itself able to submit such questions to examination, and thus and in other ways to take part in the scientific reconstruction which is in progress. The application of work of this description is, as I need hardly observe, in the first instance exclusively technical: the work addressing itself primarily to certain scientific requirements of the medical profession, and not pretending to be applicable to popular uses so immediately as the other work of the department: and, in this state of the case, it is not necessary that I should here enter, except briefly, into a discussion of the subject-matter of last year's investigations. Some short explanation, however, may be convenient.

Inoculability of  
Tubercle.

(a.) Dr. Sanderson's report relates to the process by which so-called *Tubercular Disease* is established in the animal body—such disease as, for one of its forms, is illustrated in Pulmonary Phthisis, and which, in that and other forms, is

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among the most fearful scourges of human life in this country. The morbid process, terribly frequent as it is, has not yet come to be well understood. Of its chemistry (which may probably hereafter prove to be the true criterion of its nature) absolutely nothing is yet known. Of the way in which its best recognized external causes become capable of engendering it in the human body, we can scarcely be said to have a conjecture. And even of its anatomy (though this of late years has been more successfully investigated) the facts are not yet nearly complete. On the other hand, its relation to some other diseases had long seemed, in a very general sense, to be tolerably sure: it had been assumed for instance—and the assumptions are represented in our commonly received classifications of disease, first, that the process must consist in "specific," as opposed to "common inflammatory," local changes; and then that the root of these changes must be something so inherent in the original nature of the sufferer, and so independent of any contagious influence, as to make tubercle the type of so-called "constitutional" diseases, in distinction from all extrinsic, and particularly from all "zymotic," diseases: but even while these assumptions were not openly contested, considerations were accumulating which caused every cautious pathologist to speak with great reserve on the subject. In this state of the case, suddenly, some two and a quarter years ago a very startling discovery was announced. Dr. Villemin, of the Val de Grâce Hospital in Paris, on the strength of a large number of experiments which he had performed on some of the lower animals, claimed to have established that tubercle is inoculable from subject to subject, and is in fact as "zymotic" as syphilis. Various observers (among whom I was one) were soon able to satisfy themselves that M. Villemin's descriptions were entirely true for the field within which he had experimented; but it was evident that no general view could properly be based on results such as his, till the answers to many other questions should have been brought within the field of study; and as the line of inquiry which he had opened would at any rate almost certainly involve immense pathological consequences, the more comprehensive research was peculiarly to be desired. My Lords,



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early last year, were pleased to authorize that such a research should be undertaken on a large scale in this department. One great portion of the consequent work is represented in Dr. Sanderson's present report, and other portions of it (with a view to my next annual volume) have already been committed to him for completion. The results which have hitherto been reached are not in an unqualified sense final; but even this first stage of the inquiry, besides leading as it does to ulterior questions of the utmost interest, has already given us definite and important knowledge.

The conclusions to which hitherto we have come may be stated as follows. First, M. Villemin's fact is established as unquestionable: certain of the lower animals, if inoculated from the human subject with the morbid products which are called "tubercular," will in consequence develop, more or less extensively throughout their bodies, a disease, which, so far as present criteria can decide, is identical or nearly identical with the so-called "tubercular" disease of man: and from this fact, taken with previous knowledge as to the mode in which "tubercle" in man tends to spread infectively from its original site to secondary and tertiary sites in the affected body, it would at first seem that human "tubercle" must be a specific zymotic disease. Against this, however, the correction has to be applied, that, in the rodent animals on which hitherto an immense majority of the inoculative experiments have been performed, a disease, which, if it were in the human subject, we should unhesitatingly call "tubercle," may certainly and (it seems) very easily arise in continuation of "common inflammatory" phenomena; that not only the "tubercular" inoculation from man, but other morbid inoculations, and even "common" local lesions, may be followed by diffuse tuberculation of the rodent's body; that, for instance, a slight open wound, such as that of a seton run beneath the skin, is not, as in man, an affair of simple irritation which ceases when the irritant is withdrawn, but is capable of being the first step in a series of changes which gradually infect the creature's whole body with imitations of the human "tubercular diathesis," and thus at last create such "tubercular" disorganizations as necessarily destroy life.

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Here, for the present, we stop, and it would be idle to conjecture what further knowledge may hereafter be gained in this very instructive line of inquiry. I may venture, however, to point out that some of the present observations, in converse as it were to their first teaching, prompt a curious second reflexion. They suggest, namely, a speculation with regard to human "tubercle," such as may indeed extend to many human diseases which are called specific and zymotic, whether perhaps our pathological terms "common" and "specific" may not, more than has yet been supposed, be found variable with the particular animal spoken of as affected, rather than attaching fixedly to the given diseases; whether, namely, the "common" "inflammatory" affections of some animals may not be the "specific" affections of others; whether, for instance, some "common" traumatic affection of this brute or that may not correspond in essential chemistry to this or that "specific" zymosis of man, and even in some cases be the source whence the latter was first derived. Of course no speculation of this sort can be conclusively argued till our present imperfect scientific definitions of morbid processes shall have been very greatly improved.

(b.) Dr. Thudichum's report, even in some respects more than Dr. Sanderson's, represents only part of an unfinished work of the department: but here the projected work is so large and heterogeneous that of necessity its separate sections must often be regarded as wholes. The scope of the entire work is an endeavour which my Lords are making in this department to contribute towards the establishment of precise knowledge in those chemical aspects of pathology where at present there is almost utter darkness. It is only among persons who are fairly conversant with the present difficulties of the medical sciences that the full obstructiveness of that defect can be measured. It means, alas, that very large parts of practical medicine, both preventive and curative, are even yet in a state of grievous imperfection. Both within and without the profession, certain general words which have become current are apt to convey erroneous impressions on that subject. With our various infectious "fevers," for instance:—we state that they have, as

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their common and probably essential character, an extraordinary development of contagious chemical activity (or, as we call it, "fermentation" or "zymosis") in the affected body; but behind these general words there is so little exact knowledge, that we have not the remotest conception wherein the "chemical activity" of smallpox differs from that of scarlatina or of typhus, or what is the chemical difference between their respective fevers and the fever of a broken leg or skull. Similarly with our so-called "dyscrasies":—we are ready to tabulate together under that old Greek word a large number of diseases of which we think we know that they represent habitual indolence, or other chronic misbehaviour, in the chemical working of the body or of certain organs—such habits of body as the gouty, the scrofulous, the rheumatic: but not of one of these dyscrasies, not even of the most studied of the number, are we yet able to give any description which a chemist would recognize as intelligible. And this, be it observed, is in regard of diseases which by common consent are either primarily, or in a high secondary sense, chemical. Of course a third group might be cited of other diseases which also (like the above) present very prominent chemical phenomena, but which hitherto are so imperfectly known in this point of view that we hesitate whether to call them dyscrasies or not: such diseases as cancer, rickets. Here in short is a large number of our most important diseases, for which hitherto we have not even approximately got proper pathological definitions. And the evil of this is not only that in our purely scientific discussions we are again and again brought to a standstill by the embarrassment of undefined terms;\* but also the defect which I describe lies at the very root of what is now least satisfactory in our practice. What we want in respect of our morbid processes, so far as they concern the chemistry of the body, is to be able to define them in

\* For instance, some two years ago, when the cattle-plague began to be much talked about here, public discussion arose whether the disease was of such nature that it ought to be called bovine smallpox; but this discussion was (I may venture to affirm) simply futile, as no one could define "smallpox" in any sense which would supply a reasonable standard for the comparison. And the same sort of thing is illustrated to some extent in what I have written in the preceding section as to the communicability of "tubercle." For, what is tubercle?—J.S.

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precise chemical language: to be able, for instance, as regards any disease which is rightly considered zymotic, to say that the bodily materials which it specifically affects are such and such, and that in the disease these materials pass through such and such stages of transformation, ending in such and such results: and to be able to express all this in as exact chemical terms as we apply to vinous or butyric fermentation. Failing this, we have no final pathology of such cases as are in question; nor is it likely that we should have for them, except by accident, any radical treatment or prevention. No doubt there may be lucky successes, as where we inherit specific antidotes or half-antidotes, more or less uncertain, for gout, or syphilis, or ague; and there are the many far different successes, where the skilful practitioner with treatment which is confessedly but provisional and palliative (though not on that account the less scientific) avails himself to the utmost of present symptomatological knowledge, and watchfully resists disease in the detail of each special influence by which it proximately tends to shorten life. But the total of these various successes leaves still much unsucccess to be deplored; and probably those who are most efficient in administering the present resources of medicine would be of all persons the most conscious how limited in some directions, and specially in such as I am now considering, are the resources which are yet at their command. And evidently for future progress, the possibilities of medicine are but two: on the one hand we have the chance, such as it is, that from time to time new specific antidotes may accidentally be discovered; on the other hand, there is the power of deliberate scientific discovery and application. The latter, in regard of such chemical diseases as are here under notice, must presumably, in some or all of the most important stages of its development, be a question of purely chemical work; and it would, I think, be unwise to assume in respect of any such chemical case, that the ends of preventive and curative medicine can be reached till our practical proceedings shall have got to be demonstrably based on the very chemical formula of the morbid process.

There is here of course no intention to depreciate in even the smallest degree the services which other kinds of observation



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and experiment as to the forms and forces of health and disease may render, and have rendered, to medicine. Every step in the physiological sciences, every better knowledge of the organs of the living body, and of their material and functional fluctuations under whatever influences, is of actual or potential gain to us; and such knowledge, even where it sometimes tends but little to the final interpretation of disease, constantly gives more and more success to the provisional practice which it enlightens. As regards the anatomical studies of late times, with the very advanced utilisation of the microscope, and the otherwise greatly improved means of minute structural investigation, I need hardly say that, by them, during the last thirty years, great parts of the science of disease have been completely transfigured, and that even now from year to year this mode of inquiry continues to give most valuable results. How much importance is attached to it in this department is indeed illustrated in the present volume by the minuteness of anatomical research with which Dr. Sanderson's report is written. But one of the best lessons which any science can teach us is enabling us to see what are the necessary limits of its own teaching-power; and thus by help of the microscope we have come to learn, in respect of a vast number of the most important problems of pathology, that what it can teach is only generic, while what we want to know is special, that diseases practically most dissimilar may be indistinguishable in ultimate anatomy, that our few simple types of structural change are but vague and most imperfect symbols of the innumerable chemical changes which they embody. Nor, as regards the zymotic diseases, do I undervalue the great scientific interest of such investigations as I last year quoted from Prof. Hallier in respect of cholera, and might now quote from him in respect of several other such diseases, as tending, in his belief, to establish that micro-fungi of various sorts constitute zymotic contagia; but, however great may be the future development of such investigations as those, and however unquestionable their results, the field in which such knowledge might prove applicable is one where in most instances the interest of the microscopic ferment would be

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practically as inseparable from the chemical study of the disease, as the interest of the yeast-plant is inseparable from the study of the decompositions amid which it lives.

The above, in substance, are views which I have for many years entertained and expressed as to the very great need of chemical research in aid of such practical objects as those with which this department is charged: but till very recently such researches could not have had much promise of success: and it was only three years ago that I felt justified in asking my Lords to allow me special assistance for an attempt to lessen the defects of which I complain.

Of the work which since then has been done for the Department by Dr. Thudichum, part was represented in my last year's volume by a report on the chemistry of cholera, and another considerable part is represented in this year's volume (Appendix). The medical reader will see, without surprise, that a large proportion of the present work is of a kind which may almost be called preliminary; partly that it deals with those sections of physiological chemistry with which our great patho-chemical problems are most nearly related, and in which, essentially for our purpose, very exact standards of healthy chemical process have to be ascertained; and partly that much study is given to artificial and post-mortem processes which in some degree resemble processes of disease. The more direct researches have brought into strong light (as may particularly be seen in section 3 of the Report) the necessity which caused that course to be taken. The present researches, besides investigations of particular morbid phenomena, have chiefly related to the decompositions of albuminous substances, to the coloured corpuscles of the blood, and to the coloured ingredients of bile and urine. It has been found convenient to prefix to the account of these researches a compendious introductory view of the present state of the case to which the researches apply; or (as the title of the section runs) a "sketch of chemical physiology, and of its "points of contact with pathology." Further the spectroscope has proved so essential an instrument of investigation as to require particular notice in the report; and, therefore, the information given as to the spectroscopy of the blood is



preceded by some general information as to the construction and uses of the instrument. Also the report has a supplementary section on alcohol and its relations to the human body; particularly in settlement of the much-debated medical question whether alcoholic drinks contribute to nourish the body into which they are taken.

### From the Eleventh Report to the Privy Council, 1868.

[The Eleventh Report comprises sections relating to the Public Vaccination System, which has appeared in Vol. I., pp. 370-4; General Sanitary Administration; Auxiliary Scientific Investigations; Additions to Sanitary Law, which has appeared in Vol. I., p. 550; the Question of State interference to provide for the Disinfection of Prostitutes; the Question of consolidating and bringing into system the laws and administrative agencies which concern the Public Health.—Ed.]

### GENERAL SANITARY ADMINISTRATION.

Occasional  
sanitary  
inquiries.

During 1868, as usual, in various cases within purview of the general sanitary laws of the country, my Lords had to communicate with the respective local authorities concerning action to be taken under those laws. The authorities thus communicated with were 50; including 14 of the special boards of the metropolis, 5 extra-metropolitan vestries, 15 boards under the Public Health and Local Government Acts, and 16 boards of guardians. In seven of the cases, local inquiry by an inspector under their Lordships' direction was deemed necessary, viz., at Walton-le-Dale in Lancashire, at Bootle in the same county, at Thetford in Norfolk, at Clifton-Hampden in Berkshire, at Barnet in Middlesex, at Luton in Bedfordshire, and at Dunstable in the same county.

Systematic  
sanitary  
inquiries.

In the systematic sanitary inquiries which my Lords have for ten past years been carrying on, as to the distribution of disease in England and the circumstances by which it is regulated, there was in 1868 an almost complete pause; owing in

some measure to the fact that the working power of the department was accidentally for the while much reduced; and in other part, because with the present commencing second decennium of sanitary responsibility, a new cycle of work had to be begun, and a great deal of consideration had to be given to questions of improvement of system.

The department has, however, been indebted to Dr. Ballard, medical officer of health of the parish of Islington, for a very interesting voluntary contribution to knowledge, in the form of a report on the statistics of sickness treated at the public expense in Islington during the last 12 years; and this report by Dr. Ballard is subjoined [A].

Sickness  
treated at  
public expense.

The only respect in which my Lords in 1868 extended their previous series of systematic inquiries as to the distribution and circumstances of disease, was an inquiry concerning the prevalence of venereal maladies among the poorer parts of the civil population in London; and for this inquiry Mr. Wagstaffe, one of their Lordships' inspectors, collected some detailed information which is given in his subjoined report [A].

Venereal  
diseases in  
London.

### AUXILIARY SCIENTIFIC INVESTIGATIONS.

The pathological work of the department was continued during 1868 in both of the directions to which I referred in my last yearly volume; and details of this work are given by Dr. Sanderson and Dr. Thudichum in their respective subjoined reports [A]. Dr. Sanderson, continuing from the previous year the very important investigation of tubercular disease, has now succeeded in throwing new light upon a large part of that subject-matter; and Dr. Thudichum in the chemical field of research, has made considerable further progress in continuation of the line of 1867.

Pathological  
investigations.

QUESTION OF STATE INTERFERENCE TO PROVIDE FOR  
THE DISINFECTION OF PROSTITUTES.

Proposals to  
extend the  
operation of  
the Contagious  
Diseases Act,  
1866.

The inquiry of the department into the prevalence of venereal diseases among the civil population was intended to contribute some of the elements necessary for judging a question which of late has been much agitated before the public: the question, whether it is expedient to have in this country a systematic sanitary superintendence of prostitutes. During the last few years, under the provisions of special Acts of Parliament—the so-called *Contagious Diseases Acts* of 1864 and 1866, a system of this sort has been administered on a small scale, by the War Office and Admiralty, at certain military and naval stations; and recently, while these departments have been proposing to extend their own operations with respect to the two public services which they direct, the more general question has been raised by the advocacy of a voluntary association formed for the purpose of promoting the extension of the Contagious Diseases Act, 1866, to the civil population of the United Kingdom.

Special case of  
Army and  
Navy, as dis-  
tinguished from  
that of Civil  
Population.

There are here two questions which I think cannot be too strictly distinguished: the question concerning the army and navy, and the question concerning the civil population. It has not been any part of my duty to advise on the former of these questions; and I now only advert to it for the sake of greater clearness in proceeding to discuss the other. It seems to me that prostitution and its attendant diseases, in their relation to the army and navy, are, in two different points of view, matter of public concern and responsibility; first, because the military and naval services at their respective stations are essential determining causes of prostitution, and the State, which for its own purposes keeps those masses of male population unmarried, cannot claim to be indifferent to the result; and, secondly, because the specific diseases which arise in that mode of life occasion so enormous a quantity of temporary disablement in the two services as to be of pecuniary importance to the entire tax-paying community. These I apprehend are the grounds on which rests all that has yet

been done by the Legislature with reference to venereal diseases: grounds which are in the utmost degree exceptional as regards the nature of the case: and to argue from such a case to the case of the civil population would manifestly be a confusion of judgment. Of the venereal diseases of the civil population, English sanitary law has not hitherto taken any special cognizance; and whether this neutral state of the law ought or ought not to be abandoned is a separate question, of far more intricacy than seems to be generally imagined, and which on all accounts certainly deserves most careful consideration.

In proceeding to discuss this question, I may conveniently first refer to the programme of the association which I have mentioned—the “Association for Promoting the Extension of the Contagious Diseases Act, 1866, to the Civil Population of the United Kingdom.” The Association contends “that sufferers under any kind of [venereal] contagious disease are dangerous members of society, and should, so long as they are in this state, be prevented from communicating it to others; ... that common prostitutes should be subject to a compulsory medical examination, and to compulsory detention in hospital as often as they are found diseased, and as long as they continue so; ... that, for the reception of prostitutes suffering from venereal disease, hospital accommodation should be provided in all towns where such persons congregate.”\* To give a notion of the quantity of hospital accommodation which would be requisite to satisfy this programme, I may observe, for instance, that London is conjectured to have some 18,000 women whose living is gained by prostitution;† and that, according to one of the secretaries of the society, on any given number of prostitutes, always about one-third may be assumed to be diseased.‡ If, instead of insisting on these colossal estimates, we take only half their total result, the plan would require for London alone the creation and maintenance of new hospital accommodation nearly equal to that which is now given by the twelve

Requirements  
involved in  
proposal  
concerning civil  
population.

\* Report of Association, sections 2, 33, 32.—J.S.

† Appendix of Assoc. Report, p. 22.—J.S.

‡ Mr. Curgenven, on the Contagious Diseases Act of 1866, p. 7.—J.S.

general hospitals of London for all bodily diseases put together: accommodation, namely, for 3,000 patients. The charge of maintaining (independently of the cost of constructing) such lazarets as the above would probably be at least 100,000*l.* per annum: and their construction would probably represent a first cost little short of half a million of money: besides all which there would be the considerable annual charges for police arrangements and medical inspections. This for London alone! And the requirements of other large towns would probably be of like proportions.

And how, and by whom, to be met? and on what grounds?

Demands like the above are evidently not likely to be met by voluntary contributions. The result, if to be got at all, can only be got under action of law; and any such law, whether empowering the central government to defray expenses out of proceeds of general taxation, or empowering municipalities to assign local funds for the purpose, is, of course, in relation to minorities, compulsory. Now, it is quite certain that, rightly or wrongly, the proposed appropriation of money would, in the eyes of very large numbers of persons, be to the last degree odious and immoral. In most municipal constituencies there are swarms of persons who already find it no easy matter to satisfy the collectors of rates and taxes; they would see the prostitute kept in hospital at their expense for weeks or months, not necessarily from the exigencies of severe illness of her own, but essentially that she might be made clean for hire; they would remember in contrast, that for themselves wonderfully little is done by authority to protect them against adulterations of food, or against false weights or measures; and they might regard it as a strange caprice of law which should oblige them to contribute to the cost of giving an artificial security to their neighbour's looseness of life. It seems to me very important to measure beforehand the degree in which such arguments would be valid, or rather to consider on what principles (if any) the proposed intervention of law is to be justified.

I suppose it may be assumed that public policy is very decidedly in favour of marriage as against promiscuous forni-

cation; that the latter, however powerless may be laws to prevent it, is, at least, an order of things which no State would willingly foster; that, whereas it has some inherent inconveniences, among which is the liability to specific contagious maladies, such drawbacks from its attractions are not in their kind a matter for general social regret; that venereal diseases are, in principle, infections which a man contracts at his own option, and against which he cannot in any degree claim to be protected by action of others—the less so, of course, as his option is exercised in modes of life contrary to the common good; that thus, *primâ facie*, the true policy of Government is to regard the prevention of venereal diseases as matter of exclusively private concern. *Caveat emptor!* And though it must be admitted that to some extent the consequences of promiscuous fornication spread, the infections of the brothel being oftentimes carried into simultaneous or subsequent wedlock, and in some cases fixing their obscene brand even on the offspring of such marriages; this horrid fact is only one of many which might be cited, where innocent wives and children participate more or less severely in consequences which husbands and fathers have earned. To be wife or child of a drunkard or a gambler involves evils against which the State does not affect to give security; and, *primâ facie*, the dependent interest must be equally unprotected by the State against harms which that other sort of looseness may bring on it.

I am very far from thinking that the above are the sole considerations to which regard must be had in deciding such questions as the present. But they seem to me to define a position which ought not to be abandoned, except under strong compulsion of circumstances, and with reasonable prospects of success. Evidently, if venereal diseases were now the same gigantic scourge and terror which they were some 350 years ago, when they inspired Fracastoro's poem, and if curative medicine had continued as powerless against them as then: if we saw them still raging as great intractable epidemics, impeding national movements, and forcibly occupying the mind of society with all sorts of lazarous presentations: the reasons for legislative action,

*Primâ facie*, venereal diseases are not any concern of Government;

but this with qualification.



Medical grounds on which the proposal has to be judged:

*provided such action could be effectual*, might be stronger than the reasons for neutrality, and considerations as to the personal ætiology of the disease might perforce have to be subordinated to the urgency of a public danger.

The cardinal questions, then, are two:—First, does the detriment which venereal infections cause to the public health reach those limits at which principles generally preferable ought to be exceptionally abandoned by the State? Secondly, would the good which can be got through State interference in this matter be enough to reasonably compensate for the cost at which it would have to be attained? I must confess that I cannot with any approach to confidence answer either of these questions affirmatively. As regards the first of them, I have not the least disposition to deny that venereal affections constitute a real and great evil for the community; though I suspect that very exaggerated opinions are current as to their diffusion and malignity; but since the resources of curative medicine against them are constantly becoming stronger and stronger, it seems probable that the worst of them will year by year become less and less important (as endangering life or limb) in cases where infection may obtain. It may also be anticipated that the greatly improved knowledge which late years have given to the medical profession with regard to the venereal contagia will spread, and not very slowly spread, through the minds of the general public, and will soon very much reduce the number of those sad cases where infected men give syphilis to their wives and offspring. On the other hand, as regards our power of preventing venereal diseases by such a superintendence of prostitution as is proposed, it is certain that no appreciable good would be got except with much organization, and at very large cost of money; and there are strong reasons for believing that the gain so purchased would, on analysis, be found to belong very predominantly to those kinds of venereal disease in which the community has little or no permanent interest.

what is the magnitude of the mischief?

First, as regards the actual quantity of venereal disease current in this country, and the importance of such disease to the public health, it is to be remembered that under the head of "venereal diseases" are included three chief sorts of disease,

and of course in each sort many different degrees of severity. The three sorts to which I refer, and which in any given person are not incompatible with one another, are gonorrhœa, pseudo-syphilis, and true syphilis. *Gonorrhœa* is never even temporarily of much importance to women, nor ever, unless very exceptionally, of much permanent importance even to men; but yet thus far it is not a quite unimportant infection, that in men it is often extremely inconvenient, indeed sometimes involves for a time painful and even disabling complications, and cannot absolutely be said never to leave permanent local damage behind it. *Pseudo-Syphilis*, or so called "simple chancre," is a form of ulcer which may be of considerable local destructiveness, and is often attended by inguinal buboes, but leads to no specific ulterior consequences. *True Syphilis*, arising as "hard chancre," or in other less characteristic primary affections, involves an outbreak or successive outbreaks of so-called "secondary symptoms;" which, though almost invariably amenable to medical treatment as they arise, and probably in an immense majority of cases not of more than transient importance to the person attacked, are yet not infrequently a more or less troublesome relapsing illness, and sometimes, even in spite of treatment, a long subsequent danger to life; and this true syphilis is of permanent interest to society, partly because of the cases (though comparatively very few) in which it is intractable in the person of the original sufferer, but still more because of the indefinite duration of time for which he or she may at intervals be capable of infecting others, and because the issue of syphilitic parents is apt to perish during utero-gestation, or to be born more or less syphilitic. In seeking to estimate, without exaggeration, the harm which society suffers from venereal diseases, and the good which preventive measures may possibly effect, it is, of course, essential to observe the distinctions between the above-described three sorts of disease: above all not to use the word "venereal" as if it were synonymous with "syphilitic;" and it is also essential that whatever purports to be statistical evidence on the subject should be evidence on a sufficiently large and impartial scale. The report of the "Association for Promoting the Extension of the Contagious Diseases Act to the Civil

"Population" gives some statistics which might lead to an impression that in London from one-fifth to one-third of the sick poor are suffering from "a contagious disease of the gravest character, which is constantly transmitted from parent to offspring;" but the contents of Mr. Wagstaffe's subjoined report [A] satisfy me that no sufficient grounds for any such impression exist: rendering it, I think, highly probable that, of the sick poor who at any given moment are receiving medical relief under the poor law and at dispensaries and general hospitals in London, only about 7 per cent. have venereal disease of one kind or another, and that only in about half this proportion the form of disease is true syphilis. Again, a piece of the experience of the Children's Hospital in Great Ormond Street, as quoted in the report of the Association, may seem to suggest that "about one-fifth" of the sick children of the poor are sick with immediate consequences of inherited syphilis; but on inquiry I find that, of 118,590 children of the poor treated during the last ten years for all sorts of diseases at the Ormond Street Hospital, the proportion recorded to have been syphilitic has been only  $1\frac{1}{2}$  per 100. Thus, in both cases the quantity of evil appears to be many times less than advocates of legislative interference may imagine; and it must be remembered that London probably illustrates the utmost dimensions which the evil can attain in this country.

how far is the mischief preventable?

Then, as regards the preventability of venereal diseases, even the abstract question (abstract I mean from considerations of cost) is by no means an easy one. Especially we are in want of exact discriminative information as to the good which other countries have got from their sanitary superintendence of prostitution. I believe it to be the fact that, even under strict systems of police, prostitutes in very large proportions escape the intended supervision; and that in their evasive traffic so large a dissemination of venereal diseases may be kept up as to leave in net result very little apparent success to be boasted of. Let it be assumed, however, that, in any place where circumstances are favourable, "venereal diseases" in mass may be greatly reduced under such a system: but there remains as an unfortunate accident of the case, that this

reduction might least of all affect those sorts of disease in which society is incomparably most interested; and in the absence of exact records on this point, expectations ought, I think, to be very moderate. For the various local states which most habitually spread the infection of true syphilis are apt to be in themselves such slight and painless affections as almost or entirely to escape the patient's notice; and indeed in women primary syphilitic ulcers, and other local states capable of infecting with syphilis, not only very often pass unnoticed by the patient herself, but have often been overlooked in examinations made expressly for their discovery. And with reference to proposals that particular inspections of women should take place on the information of men whom they have infected, insuperable difficulties are created in the case of true syphilis by the very long incubation-time of the primary infection: an interval generally of at least three weeks, and capable apparently of extending to six weeks or more: during which time the inoculated part presents absolutely no sign of infection; and at the end of which time the infected man may (for obvious reasons) be in utter ambiguity as to his infectress.

When the question of preventing venereal diseases is considered as one of administration and finance, some of the above facts become important difficulties. It is proposed that the organization should take equal cognizance of all sorts of venereal disease: indeed this, if the organization were in existence, would seem practically inevitable; partly because of uncertainties and precariousness of diagnosis; partly because cases, taken in the order of their permanent interest to society would very often be in inverse order to that which the relative urgency of personal sufferings would dictate. And thus, so far as the extinction of true syphilis is to be deemed the essential object of the system, the organization would in two ways tend to be disproportionately expensive: on the one hand, because expending a very large share of its strength on diseases of no permanent importance to society, and, on the other hand, in such measure as cases of true syphilis would escape the intentions of the system.—Further, when the administrative question is considered, not as national and one, but as distri-

and with what difficulties?  
and at what proportionate cost?



buted among many local authorities, a new sort of difficulty presents itself. Whatever good can be got from a sanitary superintendence of prostitution, if worked with uniform strictness through the entire country, the good will not only of course diminish, but will diminish at an immensely increasing rate of diminution, in proportion as the system is not universal and uniformly strict; so that a local expenditure which would give remunerative results, if other places were acting on the same system, might easily, in the contrary case, appear comparatively unproductive. This has been a chief point in the case of those who have pressed for an extension of the present venereal diseases law; and the Association's report has for one of its chief texts, "Free communication between localities, " fatal to success of Act in limited districts."

Practical  
conclusions:

The broad result in my mind from the various above-stated considerations is that at present I very decidedly refrain from recommending any change in that neutral position which English law has hitherto held in regard of the venereal diseases of the civil population. So far as my present knowledge enables me to judge, I believe that any departure from that position could do little but embarrass and disappoint.

as to com-  
pulsory legis-  
lation;

That under a well-planned national system, obligatory in its local operation, and stringently directed from the centre, with an enormous establishment of lock hospitals, with prostitution universally submitted to strict methodical supervision by police, and with very frequently recurring minute surgical examination of the persons of prostitutes, a great reduction might be made in the present prevalence of venereal diseases among the civil population; and that as part of such reduction (though probably in comparison but a small part) there would be a diminution in the prevalence of true syphilis; these are propositions which I do not dispute; but their very important converse has to be remembered, that, in proportion as the above conditions cannot be attained, the hope of results becomes chimerical. The conditions, I need hardly observe, are such as there can be no reasonable present expectation of seeing realized in this country; and I must add that, in the present state of my knowledge, I could not advocate any such legislation as would even approximately fulfil them. Not

only do I doubt whether the evil can in any reasonable sense be said to call for the repugnant and very costly measures of prevention which alone could pretend to be of effect against it, but also I feel bound to press for something like proportion in the treatment of such matters. And recognizing how incomplete is hitherto our sanitary system, and particularly how little pressure is yet put on local authorities in matters of far more general importance to life: recognizing, for instance, that it is almost entirely a question of private charity whether fever hospitals exist in a town, and that such hospitals are most insufficiently provided: I cannot but think that during this state of things compulsory legislation in the present matter would be a disproportion not to be justified.

On the other hand I have to observe that the somewhat uncertain amount of good which very strict compulsory legis-  
as to giving  
option to local  
authorities;  
lation might produce would less and less admit of being realized, in proportion as the provisions of law were non-compulsory; and a law, giving to local authorities or populations any considerable scope for option in the present matter would quite unquestionably be futile. Everyone knows how valueless such legislation has been in the greater part of the hitherto province of sanitary law, even as regards objects of foremost necessity to the public health; so valueless, that in all chief respects compulsory legislation has already had to be substituted for it; and the light of those experiences may be applied, mutatis mutandis, to the present extremely difficult and delicate subject matter. There probably would be detailed discussions, often indefinitely prolonged, and resulting in inharmonious conclusions, in innumerable vestries and town-councils and wardmotes; discussions which, if not to bear fruit, ought in the interests of decency to be deprecated; but of action, capable of giving success, there certainly would be little or nothing. It is true that under permissive law there have been exceptional instances of local exertion for other sanitary purposes; but even solitary instances of such exertion could not in the present matter be anticipated; for here the peculiar discouragement would exist, that no town could be sure of satisfactory results from its own superintendence of prosti-



tution unless other towns, in communication with it, were acting upon the same system.

as to legislating  
for a voluntary  
system;

In a particular proposal, which I think it my duty to mention, permissive legislation, of a sort which would almost entirely rest on a system of voluntary contributions, has been contemplated; and this proposal was received last year with some favour by the Committee of the House of Lords which had the Contagious Diseases Act under consideration.\* The proposal, viewed in relation to its professed aim, is of course open in the very utmost degree to the objections which I have just stated generally against permissive legislation; indeed, I can scarcely conceive that, if enacted, it would in any single case be of good effect; and there is a different point of view in which I would venture to submit that its admissibility (as well as that of any permissive legislation) requires to be most cautiously considered. For it seems to me that the proposed legislation, powerless though it would be for any sanitary result, would in principle be the thin end of a wedge; that the question of its acceptance or rejection is, as precedent, of fundamental importance; that, between permissive general legislation to-day and compulsory general legislation to-morrow, there would stand but the question of expense. In courses called tentative it is so easy to drift into positions which become pledges, that I venture to press this consideration. Whether the venereal diseases of the civil population are henceforth to be deemed matter of public concern, whether the civil fornicant may reasonably look to constituted authorities to protect him in his commerce with prostitutes, is the principle which I conceive to be at stake. And I would repeat my opinion that, if that principle is affirmed, the responsibilities implied in it

\* I describe the financial basis of this proposal as "almost entirely" voluntary contribution. The proposal, as I understand it, is that Government should be authorized to confer the requisite police powers for sanitary superintendence of prostitution on any local authority shown to have at command (as by voluntary contribution) the proper hospital accommodation for such purposes. And the proposal seems to assume that, if lock hospitals were established by voluntary contribution, the local authority could provide (presumably from proceeds of rates) for the cost of the medical inspections and police arrangements.—J.S.

cannot be adequately met without stringent compulsory general legislation.

Whether particular municipalities wishing to exercise within their respective jurisdictions special powers in relation to venereal diseases might properly be let acquire such powers by purely local Acts of Parliament, is, I think, a somewhat different question; and possibly such special Acts (provided they contained proper obligatory provisions) might, in certain cases, be conceded without any sacrifice of the real principles which are at stake. Every such case would then have to be judged on its own merits. But as regards any general legislation, whether compulsory or permissive, in regard to the venereal diseases of the civil community, my conclusion is very decided that at present I cannot recommend any such legislation.

as to local  
Acts.

Finally, there are some incidental considerations to which I beg leave briefly to advert. Supplementary  
remarks :

Among arguments put forward to recommend a general superintendence of prostitution, there is one which seems to have gained for the proposal a considerable quantity of non-medical, particularly clerical, support. The report of the Association, namely, alleges "that a collateral but not unimportant result which inevitably follows the establishment of preventive measures is the improvement in the moral and social condition of the women;" and a memorial which was last year addressed to the then Lord President of the Council, by the President of the Royal College of Physicians and others, supported the view "that, of the unfortunate women who are subjected to these restrictive and sanitary measures, a comparatively large proportion have been reclaimed." I believe it to be unquestionable that such women as have hitherto come under medical inspection have generally been influenced by it to become cleaner in their persons, and that the brothels inspected by police are less apt than they were to be scenes of riotous disorder; changes, on which no doubt the users of those persons and places may congratulate themselves; but which cannot without extreme abuse of terms be described as of any moral significance. On the other hand, the last clause of the statement cannot

Prostitution,  
and the ways  
of reducing it.

Prostitution,  
and the ways  
of reducing it.

fail to seem morally important to anyone who accepts it without reserve. I fear, however, that such hopes as it at first sight would seem to justify, as to possible moral results of a government superintendence of prostitution, would on any large scale show themselves essentially delusive; not, perhaps, as regards individual reclamations to be effected, even from brothels, by pure and kindly human contact, but as regards the statistics of prostitution, broadly and practically considered. For I apprehend that the concubinage-market, like other markets, tends to be fed according to demand; and that, if prostitution is really to be diminished, the principles of those who would diminish it must be preventive rather than reformatory. Of the many roots of the evil some are practically immutable, but others will undoubtedly vary with the general moral sentiments of the time. Always, of course, there are certain large quantities of mere brute passion, forcing at any price to have their way; and always, in our present social state, there are large unintelligent masses of human life with little sense of right and wrong, and much of abject poverty ready to sell itself for food, and even more of uneducated frivolous temperament. But if these be regarded as in my present sense "fixed" elements (though indeed all of them are happily susceptible of reduction) a comparatively very variable force is represented in the influence of public opinion. That parents of the educated classes regard with immeasurably different degrees of interest the chastity of their daughters, on the one hand, and the continence of their sons, or future sons-in-law, on the other, is a fact which probably has its basis in a doctrine of supposed general consequences; but knowledge which is supplied in studying the venereal diseases of the civil population—a knowledge of the mischief and misery which a young man's transient incontinence may be preparing for his whole future domestic life, certainly gives room for consideration whether these ingredients of the one case ought not to be more popularly understood. The only state of things which can be regarded as essentially antagonistic to prostitution is the system of early marriages: which, in this respect, commends itself equally on moral and physical grounds; for, in pro-

portion as it is accepted, the promiscuous intercourse of the sexes ceases to excuse itself by circumstances, and the chances of venereal infection fall to the lowest level they can attain.

Also in conclusion I would beg leave (though perhaps superfluously) to protect parts of my above argument from misapprehension. In the proposals which I have had to criticise, hospitals for diseased prostitutes have not come under discussion as charitable institutions, but solely as elements in a machinery proposed to be constituted by law for giving an artificial security to promiscuous fornication. In the latter sense I may have seemed indifferent to their existence; but in the other sense, if this occasion permitted, I would willingly plead in their favour. For some thirty-five years of hospital-surgery in London have given me the amplest opportunities of knowing what physical miseries (as well as what worse mental sufferings) attach to the career of prostitutes; and in this point of view I cordially agree with those persons who deplore the extreme insufficiency of hospital accommodation provided among us for prostitutes venereally diseased. The defect may not be for legal remedy, but not the less it is real, and I sincerely hope it may be dealt with by agencies appropriate to its nature. Such are not for me here to discuss. But considering how large a proportion of society has responsibilities of causation or connivance in that sphere of suffering and shame, and considering again what case for compassion even those who are purest from such responsibilities may recognize in states of human life so estranged and so bitterly punished, I should suppose that dictates of justice on the one side, and impulses of charity on the other, would respond, and not parsimoniously, to any well-considered appeal in the matter.

Hospitals for  
diseased  
prostitutes.



QUESTION OF CONSOLIDATING AND BRINGING INTO SYSTEM  
THE LAWS AND ADMINISTRATIVE AGENCIES WHICH  
CONCERN THE PUBLIC HEALTH.

I HAVE stated that during the past year much consideration has had to be given in this department to *questions of improvement of system* in the laws and legally constituted machinery which purport to provide for the public health of the country: and it may be convenient that in this place I briefly state my experience of the present system, and my opinion of the reforms which are wanted in it.

Spirit of the  
present sanitary  
laws.

It would, I think, be difficult to over-estimate, in one most important point of view, the progress which during the last few years has been made in sanitary legislation. The principles now affirmed in our statute-book are such as, if carried into full effect, would soon reduce to quite insignificant amount our present very large proportions of preventable disease. It is the almost completely expressed intention of our law that all such states of property and all such modes of personal action or inaction as may be of danger to the public health should be brought within scope of summary procedure and prevention. Large powers have been given to local authorities, and obligation expressly imposed on them, as regards their respective districts, to suppress all kinds of nuisance, and to provide all such works and establishments as the public health primarily requires; while auxiliary powers have been given, for more or less optional exercise, in matters deemed of less than primary importance to health; as for baths and wash-houses, common lodging-houses, labourers' lodging-houses, recreation grounds, disinfection-places, hospitals, dead-houses, burial-grounds, &c. And in the interests of health the State has not only, as above, limited the freedom of persons and property in certain common respects: it has also intervened in many special relations. It has interfered between parent and child, not only in imposing limitation on industrial uses of children, but also to the extent of requiring that children shall not be left unvaccinated. It has interfered between

employer and employed, to the extent of insisting, in the interests of the latter, that certain sanitary claims shall be fulfilled in all places of industrial occupation. It has interfered between vendor and purchaser; has put restrictions on the sale and purchase of poisons, has prohibited in certain cases certain commercial supplies of water, and has made it a public offence to sell adulterated food or drink or medicine, or to offer for sale any meat unfit for human food. Its care for the treatment of disease has not been unconditionally limited to treating at the public expense such sickness as may accompany destitution: it has provided that in any sort of epidemic emergency organized medical assistance, not peculiarly for paupers, may be required of local authorities; and in the same spirit it requires that vaccination at the public cost shall be given gratuitously to every claimant. The above survey might easily be extended by referring to statutes which are only of partial or indirect or subordinate interest to human health; but, such as it is, it shows beyond question that the Legislature regards the health of the people as an interest not less national than personal, and has intended to guard it with all practicable securities against trespasses, casualties, neglects and frauds.

If, however, we turn from contemplating the intentions of the Legislature to consider the degree in which they are realized, the contrast is curiously great. Not only have permissive enactments remained for the most part unapplied in places where their application has been desirable: not only have various optional constructions and organizations which would have conduced to physical well-being, and which such enactments were designed to facilitate, remained in an immense majority of cases unbegun; but even nuisances which the law imperatively declares intolerable have, on an enormous scale, been suffered to continue; while diseases which mainly represent the inoperativeness of nuisance-law have still been occasioning, I believe, fully a fourth part of the entire mortality of the country. And when inquiry is made into the meaning of this strange unprogressiveness in reforms intended and in great part commanded by the Legislature, the explanation is not far to seek. Its essence is

The intentions  
frustrated in  
detail:



in the form, or perhaps I may rather say the formlessness, of the law. No doubt there are here and there other faults. But the essential fault is that laws which ought to be in the utmost possible degree simple, coherent and intelligible, are often, in nearly the utmost possible degree, complex, disjointed and obscure. Authorities and persons wishing to give them effect may often find almost insuperable difficulties in their way; and authorities and persons with contrary disposition can scarcely fail to find excuse or impunity for any amount of malfeasance or evasion.

and how?

The many mere ambiguities and minor oversights of the law need not here be insisted on; for the broad jurisdictional state of the case is in itself enough to account for miscarriage.

Local authorities:  
in common  
health-areas:

Except where special health-areas have been constituted under local Acts of Parliament, or under the Public Health and Local Government Acts, the local administration of the nuisance-law in regard of its most rudimentary objects is not vested in one single authority for each place, but is distributed, with very disputable demarcation-line, between two. And as regards the distribution of voluntary improvement-powers in such places, there may be one authority for common lodging-houses, another for labouring classes' lodging-houses, another for baths and wash-houses, another for burials; and all these authorities separate from the two authorities which have to do with nuisances and drainage and water supply, and from the authority which has to do with highways. It is true that, where special health-areas exist, matters are on a better footing as regards the consolidation of nuisance-powers and improvement-powers in the hands of the town-council, improvement commission or local board; but just in these cases a new kind of evil crops up: for, except by accidental coincidence, these special health-areas do not form units of area in the population-statistics of the country; and it consequently very often occurs that these districts (which peculiarly might be expected to be able to show an intelligible balance-sheet in regard of their expenditure of life) have really no separate statistics even of their births and deaths. Also these special health-areas have not,

in special  
health-areas.

except sometimes accidentally, any relation whatever to the areas of poor-law relief; and a medical officer of health acting for the health-authority of the town has no official relations with the medical attendants of the sick poor.

Then (secondly) as regards central jurisdiction in nuisance-law and kindred matters, the conditions are equally unmethodical. Proceedings which stand to one another in the relation of first and second stages of legal intention are the responsibilities of two different chief ministries: on the one hand, inspectional and admonitory proceedings, such as my Lords of the Council direct through this department, in relation to local excesses of disease, and their causes; and, on the other hand, coercive proceedings, which the Secretary of State is empowered to take, in regard of defaulting nuisance-authorities: proceedings of the latter sort being hardly conceivable except on foundation of proceedings of the former sort. This of course is no insuperable difficulty; for the departments concerned can easily adjust their boundary line; but unfortunately in our sanitary code there are other and less superable wants of method. The essential responsibility for superintending the state of the public health is integrally vested in the Lords of the Council; but fragments of co-ordinate responsibility in the same subject-matter are also vested (for purposes more or less special) in the Home Secretary and in the Board of Trade; and thus one given subject-matter may be under consideration in two or even three Government offices, and each of these offices be required to communicate with the public concerning it.

Thirdly, as regards the relations between central and local authorities, a very unfortunate state of things is represented in the absence of certain lines of communication. Government is supposed to supervise the state of the public health: but Government may remain for long periods of time uninformed even of extremely important local outbreaks of disease. This is constantly happening with regard to typhoid fever and other nuisance-diseases of the country; and a very suggestive illustration of the fact is, that, when diptheria was first beginning to re-appear on a large scale in this

Central  
authorities.

Relations of  
Government to  
localities.

country after an interval during which the medical profession had lost all memory of it, very fatal local epidemics of what seemed a new disease were going on for two years (1855-7) in various parts of England, with the central authority of the country absolutely unapprised of the fact. In this connexion too it deserves notice, both as a matter affecting the relations of central to local jurisdictions, and indeed also as affecting the efficiency of the local authorities themselves, that, with regard to some essential elements for proper judgment as to the health of districts, the law does not even provide for the knowledge being systematically in existence. It provides, no doubt, that causes of death shall be registered; but no provision is made that the causes shall have been medically certified; and to my knowledge it has happened in regard of whole counties that, through the general absence of proper medical certificates, with the accompanying misuse of medical language by lay certifiers of death, very deceptive impressions have been given as to the local prevalence of particular diseases. A similar fault of system is shewn in the fact that no available medical returns are made of sickness locally treated at the public expense. Nor, I need hardly add, are any such returns made as to the sickness treated by our innumerable quasi-public medical charities.

Causes of the  
chaotic state of  
law.

It would be useless, though not difficult, to explain in detail how the above-described unsatisfactory state of law has come to exist. Broadly it represents two sets of causes. On the one hand, the Legislature in all these matters has evidently meant to proceed very cautiously and tentatively; and the many successive stages of attempt, while co-apparent in the statute-book, show of course a good deal of awkward piecing and overlapping, and probably more or less of accidental inconsistency, as well as a certain quantity of ground not yet covered by legislation. On the other hand, the impulses to legislation have come from many different quarters, including two or three departments of Government; and simplifications and coherency of result, such as might have been attained if all had originated from or converged to a single chief ministry for the subject-matter, are merits which, from the nature of the case, could not be expected.

I venture to submit for consideration whether now the time has not come when a better state of things than I have described can be, and ought to be, constructed. For in regard of some very considerable parts of sanitary legislation, including the machinery by which effect is to be given to the law, the purposes of tentative proceeding have now, I apprehend, been amply fulfilled; and there exists undoubtedly a very urgent public need, that the intentions of the Legislature in the present most important subject-matter should as soon as possible, and as completely as possible, be embodied, intelligibly and harmoniously, in clear consolidating law. In contribution to this result I avail myself here of the opportunity to submit some suggestions as to what, in my opinion, are the chief objects for endeavour, and what the broad outlines of such system as might easily be attained, for sanitary government in England.

Remedial  
legislation.

A. That the nuisance-law of England (using the word *Nuisance law*: *nuisance* in its largest sanitary sense) should be put on a satisfactory footing, as regards authorities and areas of jurisdiction, seems to me the first object to be aimed at; and the opportunity would probably be found convenient for making also some extensions which are wanted as regards the scope or object-matter of the present law. Of the chief objects which I think desirable under these heads, the following is a more particular statement:—

(a.) I think it essential that the separation which recent Sewage Utilization Acts have established between nuisance-authorities and sewer-authorities should cease; that every nuisance-authority should also be sewer-authority in the fullest sense of the word; that in the hands of this consolidated health-authority should also be vested all such powers as now attach to several different authorities and corporations for purposes of local improvements and inspections in the physical interests of the people, in regard of burial grounds, baths and wash-houses, labourers' dwellings, common lodging-houses, recreation-grounds, paving, lighting, &c.

to be consolidated with local  
improvement  
law:



jurisdiction in  
special health-  
areas:

in ports:

in common  
health-areas.

(b.) That cities and towns with developed municipal government should constitute special health-areas, having as health-authorities their respective town-councils, improvement commissioners, or other local boards, is a present state of law which of course would be continued; and the utmost facilities ought also, in my opinion, to be given (akin to those which the Local Government Act now gives) for the creation of new special health-areas, and for the variation of existing special boundaries, where required by local conditions. It seems probable that ports and harbours, with all shipping contained in them, must at least to some extent be regarded as special health-areas, having the harbour-authority for health-authority; and, if so, that, for cases where it would be convenient, the harbour-authority might be empowered to appoint some permanent officer to act as health-authority in its stead.

(c.) As regards places not constituted special health-areas, choice has to be made between several courses; and the one which on the whole I think has great balance of advantages in its favour is that of consistently adhering to the intentions of Mr. Lowe's Nuisance Act of 1860, by letting the common health-areas be the union-areas of poor-law jurisdiction, and identifying the common health-authorities with the common destitution-authorities of the country. The poor-law division of the country is a long-accomplished and locally well-known division, which furnishes limits to many local relations, and, not least, fixes the Registrar-General's "districts" for statistics of population and births and deaths: every union has its administrative board, presumably of the best sort which the area can be expected to give for any purpose of local government, and carefully constituted on the double basis of rate-paying suffrage and ex-officio qualification, and moreover so constituted that each parish of the union is represented in it: and this authority has its fixed meeting-place and meeting-times: it has its permanent clerk, qualified in law: and it has, always acting in detail over the whole union-area, as visitors of the poor and their dwellings, a staff of other permanent officers, medical and non-medical. No approach to such organization as this exists for any other purpose in the

rural districts of the country; and it would seem to me a simpler and safer course to bring the common health-service of the country within scope of that existing organization than to attempt a differently planned organization for objects exclusively of health. Among plans which may be conceived as alternatives to the above, it might be proposed to revert to some such parochial system as that of Sir Benjamin Hall's Nuisance Act of 1855, or to develop the parochial system of Sir George Grey's Sewage Utilization Act of 1865; but any parochial system, if not to be utterly abortive, would have to provide for the constitution of boards and offices for each parish with an elaborateness which would often seem most disproportionate; and the result when obtained would be a jurisdictional system conterminous with little except the system of church-rates. Other sorts of plan might aim at establishing a system of county-boards, with some sub-scheme, perhaps of descending scale, for smaller (say, at last parochial) sub-jurisdictions; but here again the law would fail, unless it provided for the boards and officers of the sub-jurisdictions; and all this apparatus, because of its novelty, would have to be planned so minutely, as compared with the actual work to be done in each rural sub-jurisdiction, that it could scarcely not seem excessive and pedantic. And in any of these alternative plans there would be difficulty in avoiding what, if it occurred, would be matter for extreme regret, an entire dissociation of the local health-machinery from that universal system of medical attendance which exists for purposes of the poor-law.

(d.) If, however, the common health-areas of the country are to be the areas of poor-law unions, and the local authorities acting for destitution are to be the local authorities acting for health, there are three conditions which I think ought to be observed. First, regard being had to the great extent of most rural unions, and to various other considerations, it is peculiarly necessary that the authority should be well empowered to act through committees, both for divisions of district and for divisions of subject-matter; and probably it would be convenient that such committees should be able to include persons not members of the original board.

Relation of  
health-  
authority to  
authority for  
destitution:  
in common  
health-areas:



Secondly, regard being had to the frequency with which neighbouring districts have joint interest in questions, as particularly of drainage and the like, each authority ought to have facilities, and in certain cases obligation, to combine for particular purposes, by committee or in entirety, with other neighbouring authorities. Thirdly, I think it scarcely less than essential that any law which connects for local administration the two services of health and poor-law relief should do so in a different form to that of the law now in force. At present in all common health-areas of the country the board of guardians of the poor is the nuisance-authority; but it is so *ex-officio*; and this peculiar form of law not only gives to the health-interests of the place an undue appearance of being of secondary importance, but also sometimes leads the guardians to think themselves surcharged with duties foreign to their real business. It seems to me highly desirable that, if the two administrations are to be associated, the board should be appointed, *ab initio*, expressly for the compound purpose, and should be invested by law with a new title denoting its double functions as authority for health and destitution.

in special  
health-areas.

(e.) Within almost all special health-areas of the country the health-authority is, and I must assume will for the present continue to be, distinct from the destitution-authority of the place. I accept this as fact, but I doubt if it is to be deemed an advantage. I suspect it would generally be of benefit to municipal administration if one single board, with sufficient power of acting by committee, were elected for all purposes of local government, including the relief of destitution.

Local medical  
services under  
health-law.

(f.) As regards certain medical services to be locally rendered in aid of health-authorities as such, I think, first, that every health-authority should be empowered to appoint a special health-officer; secondly, that wherever there is a special health-area the appointment of a special health-officer should be imperative; thirdly, that for areas where the destitution-authority is also the health-authority, the rule ought to be that, if no special health-officer is appointed, each medical officer acting under the destitution-authority should [for certain purposes] be deemed health-officer within the limits of his own

medical relief district.\* I think it indispensable that every-where throughout the country there should be an officer to whom the local authorities and the public may look for those definite occasional acts of inspection and certification which an amended health-law would certainly require from time to time to be executed, and to some of which I shall hereafter refer; but it is obvious that in many of the common health-areas of the country occasions for this sort of action would be so few that probably the services might best be paid by fees. In all important special health-areas, on the other hand, the services would be more or less continuous; but it could only be in some very few cases that the duties of the health-officer in a single health-area would represent entire occupation of his time; and therefore, for other cases, it seems to me greatly to be desired, with a view to procuring proper cultivation of the required medical accomplishments, that the special health-officer of one town should be free to be special health-officer to another; and that the two parties concerned should so avail themselves of this freedom that the special health-officer might be able to dispense with ordinary professional practice, and that the towns employing him might be able to secure a very high quality of special service.

Local medical  
services under  
health-law.

(g.) The system of summary procedure which is the essence of our modern nuisance-law (subject, of course, in certain cases to appeal to a superior court) ought in my opinion to be extended as far as practicable to all influences by which the public health is endangered, and the word "nuisance" for the purposes of the law to be applied to every such influence. Especially, it seems to me, that all such pollutions and obstructions of streams as may be of ill consequence to the public health ought to fall within the law of nuisance.

Extension of  
legal definition  
of "nuisance."

(h.) With regard to all such sorts of nuisance as are likely to be recurrent or habitual, the central authority, and with

Regulation  
against recur-  
rent nuisances.

\* For brevity, I use the word "health-officer" without qualification: but I may observe that the functions for which I am here proposing to provide universally are only such few rudimentary functions as to attach to a minor health-officer, and that the question of superintendent health-officers, acting for counties or any other large areas, is one on which I do not at present enter.—J.S.

its consent local authorities, ought, I think, to be able to make regulations and to affix penalty to breaches of them.

Proceedings.

(i.) All proceedings under the nuisance-law might, I believe, with advantage be open indifferently to any person aggrieved, and to the local authority, and to the central authority.

Other conterminous medical responsibilities:

B. Two very important medical responsibilities, not arising under the nuisance-law, nor under the poor-law, but created by special Acts of Parliament, have at present to be discharged, the one entirely, and the other almost entirely, by the respective destitution-authorities of unions and parishes, viz., first, public vaccination, and, secondly, medical relief in epidemic emergencies.

public vaccination:

(a.) The authority for public vaccination is now universally the destitution-authority, which in all common health-areas is identical with the nuisance-authority, but in all special health-areas is separate from it. Under the system I am suggesting, public vaccination in the common health-areas would remain substantially unchanged; it would be one of the health-functions of the double-functioned local authority; but as regards special health-areas, it would certainly admit of question whether public vaccination ought not rather to be a function of the consolidated health-authority than a function of the authority for destitution; and I am myself disposed to think that in those areas the transfer would generally be desirable.

action under Diseases Prevention Act.

(b.) Exceptional medical relief in epidemic emergencies (as requirable under the Diseases Prevention Act) is so essentially a mere temporary increase of the ordinary medical relief of the poor, that I think it ought always to be a function of the authority which administers the ordinary relief. Thus, under present poor-law, the function would everywhere attach to the destitution-authority of the place. With regard to special health-areas, where almost universally the destitution-authority and health-authority are mutually independent bodies, the law ought to take security for all necessary co-operation of the two sets of officers; and this not only when the Diseases Prevention Act is in operation, but equally as to all ordinary relations between the preventive and the curative jurisdictions.

C. Beyond the purview of such laws as I have yet spoken of, very important sanitary objects yet remain to be provided for by some sort of local administration. Such are the protection of the public against sale of adulterated and damaged food, and against malpractices of water-companies, and against offences under the Pharmacy Act; proceedings as to the diseases, especially the contagious diseases, of domestic animals; provision of skilled assistance to local magistrates when crimes against life are imputed, &c. As regards all these matters, some distinctive principles are involved, making it in my opinion for various reasons inexpedient that here the local authorities should be such as have hitherto been under consideration. One immensely important group of functions under the present head is to protect the public health against various kinds of commercial wrong; and if powers for this purpose are to be strongly and impartially exercised, it would seem desirable, first, that the areas of jurisdiction should be as large as conveniently may be, and then that the empowered authorities should rather be of magisterial type than consist of boards constituted by annual popular election. Probably the magistracy of boroughs and counties, as represented in courts of quarter-session, would be the best local authority in the matter; and it might, I submit, be required of each of these courts to appoint a public analyst, with definite duties under the adulteration laws, and with reference to public supplies of water, and various like matters. It seems to me that, for all health-matters not in the hands of nuisance-authorities or destitution-authorities, an uniform constitution of authority on this magisterial basis might very conveniently be provided; bringing more or less completely into one system the local supervision of branches of trade which concern life, and the local supervision of cattle diseases, and the local supervision of lunatic asylums, and local arrangements for providing skilled evidence in aid of coroners' inquests.

Local medical functions attributable over larger areas.

On the present occasion my subject-matter consists so especially of questions of method and organization, that I must here pass without mention many points where the law seems to me in other respects to require amendment; but I



may observe in passing, that many of the most important objects which I propose should be matters of quarter-sessions authority are hitherto very imperfectly provided for by law.

Central authority in regard of regulations and sanctions.

D. For certain cases where public health is in question, the central authority is authorized by law to issue orders and regulations which, when issued, have the force of law in relation to the local authorities addressed. And in certain other cases the right of local authorities to take particular courses of action is by law made contingent on the central authority's giving approval to such courses. What ought to be the precise extent of the discretionary control to be thus exercised by central authority in local affairs is not a question which needs here be discussed; but the number of cases which statute-law cannot touch in exact terms is so great, that manifestly, if such law is to work with promptitude and ease, it must, to a greater or less extent, be supplemented by that elastic margin of what may be called law in reserve.

Ordinary relations between central and local authorities.

E. The ordinary administrative relations which the law supposes to exist between local authorities and central authority in relation to the public health are in substance two:

first, that the central authority watches the fluctuations of health in all the health-areas of the country respectively; and, secondly, that, discovering from indications thus supplied the cases where health-law is not properly administered, it takes steps, which in the last resort may be coercive of local authorities, to procure proper obedience to the law.

The extent to which the law imposes definite obligations on local authorities assigns of course a limit to the central authority as regards the class of cases where its coercive interference is possible; but far beyond that limit, as well as also within it, innumerable cases present themselves, where mere information and advice from the central authority may be influences of the utmost value in determining local authorities to right measures for the public health. It is manifest that functions of this sort cannot be exercised by any central authority except in proportion as it

is cognizant of local variations in the public health: proper provisions for making all such variations known to the central authority are therefore elementary necessities in that mixed system of central and local government which the law has intended to operate for sanitary purposes in England: and greatly to improve the provisions which now exist in this country for recording and reporting the deaths and sickness of the community, is, in my opinion, an object of quite fundamental importance among such improvements of method as I am considering. The chief points where I think amendment wanted for purposes of general administration are as follows:

(a.) With regard to the knowledge which ought to be had concerning the deaths of the population, I have three suggestions to make. Knowledge of deaths to be made available:

First, in my opinion, the law ought as far as practicable to require in every case of death that the cause of the death be medically certified. Exception, not in substance but in form, might have to be made for cases where coroners' inquests are held; *i.e.*, the verdict of any such inquest must of course be understood to include the substance of any required medical certificate. And possibly, for very exceptional circumstances, it might be desirable to provide that, in them, any magistrate's order should exonerate from the necessity of the certificate. But, subject only to such qualifications as these, it seems to me that in all cases of death a medical certificate of the cause of death ought to be required; a certificate to be obtained, where practicable, from the medical practitioner who attended the fatal illness; or, where there has been no medical attendant, or none from whom a certificate can be obtained, from the public health-officer of the district. medical certificates:

Secondly, I think it essential that the division of the country for purposes of census and registration of births and deaths should, as far as practicable, treat as separate districts or sub-districts all areas which are separately identified for purposes of health administration. New special health-areas are constantly in course of formation under the Local Government Act, and perhaps otherwise; local distribution:



and I would suggest that, as soon as possible after the formation of any such special health-district, it should be created a district or sub-district for purposes of registration and census.

statistical  
returns.

Thirdly, I refer with admiration to the detailed numerical statement which the Registrar General issues every Tuesday on the subject of the deaths of the metropolis during the last preceding week: a statement which relates to three millions of population occupying 137 separate sub-districts, and which not only gives the gross number of deaths for each sub-district respectively, but distinguishes also for each sub-district the more important causes of death; so that persons interested in the health-administration of London are able at a glance to see, with considerable minuteness, in what parts of London each of the principal zymotic diseases has been fatal during the previous week, and what number of deaths in each sub-district each such disease has produced. If what is thus done every week for about a seventh part of the population of England could be done for the whole population, not every week, but every quarter, this quarterly publication would represent one of the most important aids which could be rendered to the health-administration of the country. The present quarterly returns of the Registrar General state what gross number of deaths has occurred in each registration-district of the country; and a few of the sub-district registrars comply with a request which the Registrar General has during some years past made to all of them for "notes" on the prevalence of particular diseases in their sub-districts. But not even an approximative opinion as to the distribution of disease in the country can be formed from these imperfect and uncertain materials; and it is not till nearly two years later that the detailed results of the registration of deaths can be gathered from the annual reports of the Registrar General. A system of quarterly death-reports for the entire country, in general conformity with the weekly death-reports which are given for London, is therefore among the amendments for which I hope.

Knowledge of  
sickness to be  
made available.

(b.) With regard to the knowledge which ought to be had concerning the sickness of the population, I think that, greatly

for immediate purposes of medical science and health-administration, and in an even higher degree for common purposes of public economy, certain broad information ought periodically to be given as to the quantities and kinds of sickness treated by the several destitution-authorities and by the several medical charities of the country. As regards the former, it would seem desirable that at fixed intervals (say quarterly) each destitution-authority should state in a fixed tabular form, for each of its medical relief districts, what numbers of cases of disease generally, and of a few of the more important epidemic diseases individually, had been remaining under treatment at the commencement of the period; and what numbers had been remaining at the end; and what numbers of new cases had come under treatment during the period; and what number of deaths had occurred among new cases and old cases respectively. And as regards medical charities, I venture to suggest that, in the rightly understood interests of their subscribers, no less than for other ends to which I have referred, a system of uniform registration, and an uniform contribution of annual returns, ought to be claimable from them by the central authority, in reference to the sexes, ages, numbers, and kinds of cases treated by them respectively, and to the duration and results of treatment.

Knowledge of  
sickness to be  
made available.

F. That any central offices which have to do with sanitary affairs ought, like the local authorities and jurisdictions, to be methodically related to each other and to the public, on some simple consistent plan, according to their respective subject-matters, is of course indisputable: but this section of the argument does not here require at my hands more than a few explanatory remarks. If the present central offices which are more or less concerned in the question be regarded according to their main intentions, and therefore without reference to such minor flaws and uncertainties of jurisdiction as any consolidated law would at once rectify, the following may be taken as their scheme.

Central  
authority.

(a.) The functions which my Lords of the Privy Council exercise through their Medical Officer, and for which the Medical Department of the Council Office is constituted under

Functions of  
the Lords of  
the Council.

Functions of  
the Lords of  
the Council.

the Public Health Act, 1858, are the essentially sanitary functions of Government: such as the following:

to take practical cognizance of all important faults and fluctuations of the public health, general or local; looking at each such fault or fluctuation as a question of cause and effect, and examining for the common interests whether in each suffering or endangered place everything is done which ought to be done in prevention of the beginnings or spreadings of disease; and thus and from other points of view to act in supervision of all local health-authorities as such, and to give them such advice or to adopt such other measures as the circumstances in each case may shew necessary;

to provide an office of reference and appeal for local authorities and for the people generally on all considerable sanitary influences operating in the country, and on all other public questions of causation and prevention of disease, so far as the knowledge of the time enables such questions to be answered, an office in which scientific knowledge of this sort shall be systematically gathered and reported for public use, and in which, so far as practicable, such knowledge shall be increased from year to year by special scientific investigations;

to issue, and afterwards to superintend in operation, such orders, regulations and sanctions, as the Government with medical advice sees fit, in relation to various special matters which the Legislature has made subject to this control: as local provision against epidemics, performance of public vaccination, questions as to practice of pharmacy and sale of poisons, questions as to the medical profession, &c.

Offices con-  
nected with  
Medical De-  
partment of  
Privy Council.

(b.) There are two offices which, by a part of their subject-matter, have close, though not extensive, relation to the Medical Department of the Council Office; two offices, namely, which both are under direction of Her Majesty's Home Secretary of State. On the one hand there is the great arithmetical office, over which the Registrar-General presides: the office to which the public looks for all numerical information obtained by periodical census and from local registers, as to the numbers, ages, sexes, birth-places, industries, and family-combinations of the people, and as to the marriages, births

and deaths, which take place amongst them: and I need hardly observe that one part of this statistical information constitutes an indispensable basis for some proceedings in the Medical Department. On the other hand, there is the office through which the Secretary of State, under authority of the Local Government Act, controls the exercise of rating and borrowing powers for purposes of local improvement under the Act, and, incidentally to this control, has before him for skilled criticism the various proposals of local authorities for drainage, sewage-utilization, &c. And as this office (essentially including a staff of engineers) has been found the most convenient machinery through which the Secretary of State can advise, and in case of need enforce, in regard of localities, certain constructional improvements which may be needful for the health of the inhabitants, so, in the particular cases where necessities of this sort are in question, the action of Government may be considered as consisting of two stages: the first conducted in this department of the Council Office, and the second conducted in the local improvement office of the Home Secretary. This department then, which is essentially medical, has an important point of contact with each of those two non-medical offices: but the three subject-matters, in their main extent, are necessarily separate for administration. Whether the three offices ought still to remain as now divided under two chief ministers, or might more conveniently be all made subject to one, and, if so, to which one, are questions which of course involve many other considerations than those on which it is my province to enter. I am however permitted to state that these questions, with others relating to the distribution of central sanitary work, are at present being considered by the Ministers whose departments they specially concern.

Offices con-  
nected with  
Medical De-  
partment of  
Privy Council.



**From the Twelfth Report to the Privy Council, 1869.**

[The Twelfth Report comprises sections relating to the Special Diseases of the Year; Nuisances Removal and Water Supply; Public Vaccination, which has appeared in Vol. I., pp. 374-93; Papers relating to the Constitution of the Medical Profession (transferred in the reprint to the section devoted to that subject, Vol. I., pp. 508-18); The Practice of Pharmacy (also for convenience transferred to Vol. I., pp. 551-3); Scientific Investigations in aid of the practical work of the Department.—ED.]

**THE SPECIAL DISEASES OF 1869.**

**1. Relapsing Fever.**

Relapsing  
Fever.

A very exceptional fact concerning the health of England in 1869 was that we were under evident re-visitation by *Relapsing Fever*, a disease generally almost unknown in England, but which during the later months of 1869 acquired considerable prevalence in London. From as far back as the middle of 1868 occasional facts had been suggesting that London was not unlikely to suffer from such an epidemic; and a curiously local but severe epidemic of the disease is stated to have prevailed within this time among the iron-mining population of Tredegar, in Monmouthshire. Towards the autumn of 1869 decided threatenings of danger to London came to light in the practice of the London Fever Hospital, and, as they increased, soon led Dr. Murchison, physician of that useful charity, to draw professional attention to them by a letter (dated October 9th) in one of the medical journals. My Lords, having Dr. Murchison's facts before them, and seeing their very serious importance in relation to the health of the metropolis, thought it right immediately to bring them under the particular notice of the Poor Law Board and of the metropolitan Officers of Health, with a view to ensure, as far as possible, that, while there was yet time, proper precautions against the danger should be taken; and one of the inspectors of this department (Dr. Buchanan) was specially charged with the duty of reporting on the progress of the disease in the

different districts of London, and of personally communicating with local authorities and officers where the disease was spreading. Somewhat later, the disease being evidently on the increase, and the circumstances having become more urgent, my Lords addressed a circular letter to all the boards and vestries of the metropolis, drawing their attention to the powers conferred on them by the sections of the Sanitary Act, 1866, which have reference to infectious disease; and their Lordships continued in communication with the Poor Law Board (who on their side were communicating with the local destitution-authorities of London) as to the action which, in the circumstances, had to be taken under the poor law. Extracts (which I subjoin[A]) from an office memorandum written on the 22nd October, and then communicated to the Poor Law Board, may serve to show what, down to that date, had been the early steps of the epidemic in London; and the following extracts from a later issue of the same memorandum, when circulated among the local authorities of London, briefly explains the nature of the claims which those authorities were now called upon to meet.

"For local authorities, having to treat the disease or to take precautions against it, the chief practical points to be borne in view are the following.

"i. The greatest personal predisposition to Relapsing Fever is given by states of poverty and privation: so much so, that the disease is often known by the name of 'famine-fever.' Where destitution has not existed, or has been adequately relieved, relapsing fever is not likely to be epidemic.

"ii. Relapsing fever is in a very high degree communicable from sick to healthy. The more confined the atmosphere in which sick and healthy are together, the more certain is the disease to be communicated.

"iii. An attack of relapsing fever is greatly less dangerous to life than an attack of typhus. But where relapsing fever has attacked, and when all its acute symptoms are past, the sufferers remain for a while extremely weak, requiring that food and restoratives should be liberally supplied them; in default of which, the feebleness left by the disease may often



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be of indefinite duration. This is the more important, because, where relapsing fever becomes epidemic, typhus often accompanies or follows it; and persons whom the relapsing fever has weakened, not unfrequently fall victims of typhus.

"iv. Relapsing fever is eminently a disease which cannot safely be treated in the houses of the poor; for in them, crowded and ill-ventilated as they generally are, and with inmates often insufficiently nourished, there must be every likelihood that the infection will spread. It is essential that, under such circumstances, the sick should at once be removed from amid the healthy. Ample hospital-accommodation is therefore an indispensable condition for limiting the extension of the disease.

"v. Of duties which have to be discharged by local authorities in the several parts of London in relation to the present subject-matter, some are duties of poor law relief, and others are duties of general sanitary administration; but as the former are done under direction of the Poor Law Board, only the latter are here adverted to. At present (as in all times when epidemic disease is prevalent or threatening) it is particularly important that powers conferred by the Nuisances Removal and other General Sanitary Acts should be well exercised by those in whom they are vested. Very detailed district inspection is most necessary. Everything practicable should be done, especially in all poorer parts of each district, to promote cleanliness of and about dwellings. The washing and lime-whiting of uncleanly premises, especially of such as are densely occupied, should be pressed with all practicable despatch. It is essential that over-crowding should, as far as possible, be prevented, and proper ventilation be enforced; and in these respects common lodging-houses, and houses which are sublet in several small holdings, will require particular attention. Above all, the attention of nuisance authorities is invited to the powers conferred on them by various sections of the Sanitary Act, 1866, with reference to infectious disease; especially to the powers conferred for purposes of disinfection, and for the conveyance of sick persons, and for the separation of the sick from the healthy.

"vi. It is essential for the local authorities of London to know that at the present time the London Fever Hospital is full; that henceforth neither it nor any of the general hospitals of London can be looked to as capable of giving assistance in any degree adequate to the probable growth of the epidemic; and, consequently, that districts where the disease exists will be very seriously endangered if special hospital accommodation for their sick be not at once provided."

In the emergency which the foregoing statements represent, and which (as the last paragraphs may particularly suggest) implied some most formidable possibilities for the poorer population of London, a good fortune which could not be too highly appreciated was, that, under the amended Metropolitan Poor Law, the all-important business of providing proper hospital-accommodation for the sick did not need to be done in fragments by a number of mutually independent small authorities, but could be worthily dealt with as a whole by the Metropolitan Asylums Board. The representations which my Lords had addressed to the Poor Law Board on the pressing exigencies of the case, led to vigorous action being taken by the Asylums Board; and in consequence of this, partly through the facilities which it gave to the infected parts of London for eliminating their infected sick, and partly through the pains which local authorities were induced to take to turn those facilities to proper account, a very real check, which gradually became more and more effective, was given to the progress of the epidemic. In November, as a first step, the accommodation of the London Fever Hospital was increased, at the expense of the Metropolitan Asylums Board, by the erection of an iron building containing 64 beds; and the Asylums Board commenced in December, on its own ground at Hampstead, the construction of another fever hospital, which was opened at the end of January, with capacity for 90 patients.

The admissions of relapsing fever into the London Fever Hospital in October had numbered 130; in November they were 259; in December 315. Here, perhaps, strictly speaking, my statements on the subject ought to cease, as my report

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formally relates only to the business of 1869; but probably I shall be excused for adding the more satisfactory experience of the first three months of 1870. After Christmas the disease increased in the district of Holborn with Clerkenwell, and in the parish of St. Saviour's, Southwark, and appears to have attained at the beginning of the new year its chief extension over the poorer parts of London. In January the cases of relapsing fever admitted into the London Fever Hospital were 258: in February the London Fever Hospital together with the newly opened Hampstead Hospital received 153 cases only: in March they received 140. At the present date (March 31st, 1870) the two hospitals contain 103 cases of relapsing fever; the disease is on the wane; and the months of winter, during which such infections are particularly apt to spread among the poor, have happily now passed with comparatively a trifling epidemic. The districts which recently have supplied most cases have continued to be Whitechapel, St. Giles's, and Camberwell.

I have to add that, in the earlier periods of the epidemic, when the London Fever Hospital was proving insufficient for the emergency, the London Hospital in Whitechapel devoted a ward to the reception of cases of relapsing fever, and treated in all, during the three or four months, 65 cases of the disease. Otherwise, the general hospitals of London have done nothing, or next to nothing, in the matter. Of course a number of cases, perhaps a considerable number, has been treated in the dwellings of the poor; but every endeavour has been made, and it is hoped with fair success, to make this dangerous plan of treatment exceptional.

The mortality from the fever has, as usual, been very low. Of 769 cases treated in the London Fever Hospital in 1869 (among whom men exceeded women in the proportion of 474 to 295) only 17 cases were fatal; and these few deaths occurred chiefly among persons previously weakened by age or disease.

At the present date it would be premature, even as regards London, to speak of the visitation of relapsing fever in a purely retrospective sense. For the infection still exists among us in more than sufficient quantity to constitute a very

formidable danger to the public health if circumstances were such as to favour its spread. So far, however, as we know the circumstances which might tend to that grievous result at present are not, nor for some months are likely to be, in any such relative excess as to promote a great extension of the disease. Meanwhile it is satisfactory to note that though cases of the fever have occurred and are still occurring in other great towns of the United Kingdom, in them, generally speaking, the disease has not hitherto been at all abundant; and we may fairly hope that before winter returns the infection of relapsing fever will have become again extinct in places which at present are retaining it.

I ought not to close this section of my report without adverting to the negative fact, that although during 1869 the public health was seriously endangered by the above-described visitation of relapsing fever in London, and although a special statute, the so-called "Diseases Prevention Act," has been provided by the Legislature, to be put in force by the Lords of the Council, at their discretion, "whenever any part of England appears to be threatened with or is affected by any formidable epidemic, endemic, or contagious disease," my Lords in 1869 did not see fit to put the Diseases Prevention Act in force. Had the Act been put in force in London, it would have added almost nothing of any real practical value to powers and sanctions otherwise existing; while, far outweighing any little good it might so have promoted, it would have detached the provision of hospital accommodation from the general poor-law provision of medical relief, would in the former most important respect have substituted a very uncertain for a comparatively sure machinery, and might not improbably have done the enormous mischief of perplexing an urgent crisis with wrangles of ambiguous jurisdiction. For, as matters stood, the duty of providing adequate hospital accommodation for destitute infected persons—and, broadly speaking, all the infected were destitute—was, without any manner of doubt, an obligation on the poor-law authorities; an obligation intimately akin to the ordinary relief duties



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of those authorities; an obligation too, which, under recent amendments of poor law, those authorities (as I have already explained) had peculiar facilities for successfully discharging in regard of the metropolis as a whole. On the other hand, if the Diseases Prevention Act had been put in force in London, these advantages must have been sacrificed. The local authorities for the purposes of the Act, including all requisite hospital accommodation for the sick, would have been the vestries and district boards of the metropolis; bodies not ordinarily exercising other functions of medical relief, and therefore likely to exercise the required function under some considerable disadvantages; bodies, moreover, not so related to one another that anything like concerted action for the metropolis as a whole could within any reasonable time have been expected from them. Further, if the ripe intentions of the legislature with regard to the incidence of taxation for the relief of destitute sickness in the metropolis may be gathered from the provisions of the Metropolitan Asylums Act of 1867, rather than from those of the Diseases Prevention Act of 1855, only very strong reasons could have justified the Lords of the Council in having recourse to the latter Act; under which, so far as it could be of effect, the cost of providing hospital accommodation in the poorest districts of London, where likely to be almost exclusively needed, would have had to be borne as a separate very onerous charge in each such district for itself, instead of being (as under the Metropolitan Asylums Act it was) a very slight additional charge on the metropolis, considered as a whole. And moreover the legal difficulty was felt, which any poorer district unwilling to accept the above charge might at its option have raised, that, notwithstanding the enforcement of the Diseases Prevention Act, the Metropolitan Asylums Board would retain its full previous responsibility to provide hospital accommodation for the destitute classes of London.

The above considerations will no doubt sufficiently explain why my Lords in 1869 left the Diseases Prevention Act unapplied. And the representations which my last year's report contained, on the chaotic state of English law in relation to sanitary government, certainly received a striking comment,

when the statute which purports to provide for emergencies of epidemic disease, a statute not yet fifteen years old, had in an important crisis to be treated as virtually obsolete, because its enforcement would have confused instead of simplifying, and have weakened instead of strengthening, the machinery which it is imagined to make more effective.

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## 2. *Scarlatina*.

The year 1869 was marked by a very extensive and fatal prevalence of *Scarlatina* in England. The total number of deaths which were thus produced in England, and the local distribution of those deaths in the country, will not be known till the time (probably about the middle of 1871) when the Registrar-General can publish his compilation from the local registers of 1869; but that throughout the year a very widespread and destructive epidemic of scarlatina was prevailing, was made evident not only by the general alarmed outcry of the public, but, as regards some places, by detailed statistical information. Particularly as regards London, the arithmetical details were published week by week by the Registrar-General, and they, during great part of the year, were certainly enough to excite alarm; for the weekly number of scarlatina deaths in London, which for the first half of the year had averaged but about 50, began after Midsummer rapidly to increase, soon passed 100, were above 200 before the end of September, thence till the middle of December kept the very high average of 220, and by the end of the year had taken in London altogether as many as 5,803 lives. In the two years 1863-4, scarlatina destroyed in England more than 60,000 persons; and so far as comparison can yet be formed between that and the present epidemic, it seems probable that the present epidemic is of at least equal severity. The existence of so great an epidemic seemed a proper occasion for this department to circulate such advice as it was able to give to the public on the precautions which could be taken against scarlatina; and with this view, under their Lordships' authority, I prepared and extensively circulated the subjoined memorandum. See below, page 393.



Scarlatina.

At the present time, with scientific knowledge limited as it is, and with our very imperfect administrative resources, anyone who is responsible for advising on the requirements of the public health must feel extreme difficulty, and indeed almost humiliation, in having to advise about Scarlatina. The disease is eminently one which we should wish to prevent; for, so far as it is unprevented, not even the best medical skill can always, or nearly always, cure it; and thus year by year it kills thousands of us in England, besides inflicting enormous suffering (not infrequently with permanent injury) on many other thousands whom it attacks but does not kill. Yet, as knowledge and administrative resources now stand, official powers of preventing this murderous disease are, practically speaking, insignificant; and such general advice as may be given for individual preventive purposes has so little likelihood of being applied except in select cases, that, as regards the main mass of sufferers, it may seem almost insincere and derisory. Scarlatina is profusely, and to a certain extent uncontrollably, contagious: uncontrollably, in so far as science cannot yet offer against it any such personal protection as vaccination confers against small-pox; uncontrollably again, in so far as, in order to spread, it does not, like typhoid fever and cholera, depend or mainly depend on conditions which moderate sanitary care removes; uncontrollably further, in so far as its contagium is of most persistent activity, and remains in force for indefinite periods of time in clothing, bed-furniture, and other objects which give it a resting place. Of this subtle and destructive contagium we know no other birthplace than the human body. We know that persons who themselves are under its influence evolve it in enormous quantities; but by what process of formation in the human body, or from what source in external nature, it had its first rise, and can apparently still from time to time have new beginnings or multiplications, is far beyond our positive knowledge. Thus, at present, *we have not any other known power of dealing preventively with the disease than such as consists in intercepting all contagious communication between the infected and the non-infected parts of the population.* Thoroughly to isolate the sick from

intercourse with susceptible persons, and thoroughly to trap Scarlatina, and exterminate all contagium which the bodies of the sick evolve, are the preventive feats which have to be accomplished. The difficulties of the task are extreme. Often they are not successfully encountered, even in wealthy and well-ordered establishments, with every material and educational advantage; and no one who is conversant with the domestic circumstances and habits of the great masses of our population can expect that among these millions, particularly in the poorer and more crowded dwellings of the labouring classes, the spreading of scarlatina will be very effectively resisted by such measures as alone are yet available.

It seems to me immensely important, not only with reference to scarlatina, but generally with reference to all dangerous communicable diseases, that the public should clearly understand what are, and what are not, the possibilities and the hopes of preventive medicine. These may be indicated under two heads.

In the first place, taking scientific knowledge as it now stands, scarlatina cannot be effectually resisted except in proportion as the public is prepared to enforce a thoroughly strict system of isolation-rules against infected persons, and infected houses, and infected furniture, and infected clothing. That such rules in their utmost strictness would be very onerous, can of course not be denied; but even by measures short of extreme strictness our present immense amount of injury might be greatly lessened; and it surely is not unreasonable to demand for human life in this respect some of the same sort of administrative efficiency as the money-interests of cattle-keepers have received. If scarlatina and the like diseases are to be stopped, first let certain local facilities for dealing properly with dangerous infective diseases be claimable within every health-jurisdiction of the country—facilities which are hitherto almost universally non-existent among us; and then let the authority of every such jurisdiction be by law required to take definite precautionary means against the diffusion of such diseases. It would be needful, and for the purpose in view would require to be made a legal obligation, that every health-authority of the

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country should have sufficient proper and permanent hospital-accommodation for cases of infective disease arising within the jurisdiction, and should have all disinfectant processes necessary for protection of the public health done under direction of a skilled officer, and as far as necessary at a public establishment and at the public cost, and should take the initiative in enforcing, as regards sick persons and dead bodies and infected things, such several rules of conduct as universal experience dictates, to prevent the wanton spreading of disease. Doubtless such rules would interfere with certain hitherto permitted freedoms: that children should at their parents' discretion carry infection from families into schools, that schoolmasters should at their discretion disperse infected children haphazard about the country, that householders should at their discretion send infected wash-things to common laundries, that lodging-house keepers should at their discretion conceal the infectedness of their apartments, that all sorts of people in all sorts of ways should at their discretion endanger others: but I apprehend that, in the present state of our knowledge, freedoms such as the above can in practice only mean an unlimited acceptance of disease; for to imagine that, while such freedoms are allowed, extremely contagious diseases will spontaneously cease, is an absurdity which when the cattle-plague was in question no average cowkeeper entertained.

In the second place, though at present any more radical resistance to these dreadful infections is not within the resources of preventive medicine, hopes may fairly be entertained that in time such other resistance will become possible; that, in proportion as exact scientific knowledge penetrates more deeply into the mode of generation of these contagia, preventive or counteractive means, hitherto unimagined, will be added to our resources against them. I cannot express in adequate terms how very great an importance ought in my opinion to be attached to the sorts of scientific research by which such results may be realized. Considering on the one hand what Jenner's discovery in relation to one such disease has done for the whole human race: what addition to collective human strength it represents, and what mitigation of

human suffering: and considering on the other hand the immeasurable ravages of the remaining unconquered contagia; I cannot conceive any scientific problems worthy even to be compared in importance with such as are here referred to. Studies more or less tending to solve these problems are fortunately now being followed with due zeal and intelligence by various foreign observers; and in this country (as will be more particularly seen in later parts of the present report) my Lords of the Council have accepted, as among the responsibilities of their medical department, to take such active share in that scientific work as Parliament may be willing to sanction, and as other claims on the department will allow. Necessarily, however, in genuine science the progress of most discovery is slow; and the nature of the present subject-matter is such that, except in so far as accident may happen to assist us, the work may have lasted for years before it essentially alters the practical aspects of the case. Therefore, though I here mention these studies as justifying in my opinion very sanguine hopes as to the eventual preventability of zymotic disease, provisionally I must count them as almost nothing. And in this sense, taking scientific knowledge as it now stands, scarlatina, I repeat, cannot be effectually limited except in proportion as the public is prepared to enforce thoroughly strict isolation-rules against it.

## APPENDIX.

## PRECAUTIONS to be taken against SCARLATINA.

In every case where scarlatina prevails or threatens to prevail in a district (as, indeed, wherever there is prevalence or threatening of any other epidemic disease) it is of more than common importance that, both by private action and by action of local authorities, everything practicable should be done to ensure freshness of atmosphere and dryness of soil and entire absence of dirt throughout the district, especially in and about houses, and to guard against overcrowding of inhabitants, and to provide that impure water be not drunk. It is of course particularly necessary that such district-inspections as are ordered by section 20 of the "Sanitary Act, 1866," should be frequently and carefully made by the nuisance-authority, and that whatever proceedings are required to procure the abatement of nuisances should be pressed with all practicable despatch.

Local authorities and the public ought also to bear well in mind the contagiousness of scarlatina, and the precautions which that property of the disease

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against  
scarlatina.



Precautions  
against  
scarlatina.

renders necessary. Each patient who has scarlatina, whether in a severe or in a slight degree, makes round him an atmosphere in which other persons, if they have not previously had the disease, are very likely to become infected with it. Also, where death occurs, the body of the patient, while unburied, continues a centre of infection. The property of infectiousness attaches probably more or less to all matters which pass from the body of the patient during his disease and convalescence; but doubtless it belongs especially to those matters which come from the throat and nose, and from the skin of the patient: the former in foul fluid and solid discharge, and tainting the breath of the patient; the latter, particularly represented in the flakes and grains of dry skin which, after the first few days of the disease, begin to be shed in the so-called peeling or desquamation. During the illness of the patient infectious particles of these sorts are plentifully diffused in the air round about him, abound in his clothes and bedding, and may attach more or less to all objects in the room. If left to themselves they preserve their infectiousness for very long periods of time; so that, for instance, handkerchiefs which have been used to the patient's mouth and nose, and bedding and clothing which contain the bran-like dust from his skin, and in various degrees all things which have been in use in the room, and the dress of persons who have attended there, may, for an indefinite time, be sources of danger. And it is by reason of particles of this kind still hanging about the persons of convalescents, or remaining attached to their clothes, that the contagion of the disease is so persistent.

In taking precautions against the spread of scarlatina, the above points have to be applied, as far as practicable, as follows. Every person who sickens with the disease should at once be removed from among the healthy; and if his circumstances do not permit of this being done in his own home, he ought to be treated in hospital. The room to be used as sick room should, if possible, be one which has a passage or staircase to itself as apart from the general passages of the house; and it should admit of being thoroughly well ventilated (as by windows and chimney) directly into the open air. It should be divested of every unnecessary thing to which dust and fluff are likely to attach. Persons in attendance on the sick should be persons who already have had the disease. Between the sick room and the rest of the house there should be no unnecessary intercourse. In the room, and on the person of the patient, every practicable disinfection should be effected without delay. Some strong disinfectant fluid should always be in use in the room for the various occasions which arise, with reference to the discharges and utensils of the sick, and the hands of the attendants. Handkerchiefs and other like articles, as soon as fouled by the patient, should be well scalded with boiling water, or immersed in the disinfectant fluid; and bedding, and other like articles which cannot be treated thus extemporaneously, should be removed, suitably packed, to the place where they can be otherwise disinfected. It is believed that the dispersion of contagious dust from the patient's skin is impeded by keeping his entire body (including limbs, and head, and face) constantly anointed with oil or other grease; and some practitioners also believe this treatment to be of advantage to the patient himself. When the patient's convalescence is complete, the final disinfection of his surface should be effected by warm baths, with abundant soap, taken on three or four successive days, till no trace of roughness of the skin remains. After this process and with clean clothes, he may be deemed again safe for association; but, previously to this, however slight may have been his attack he ought always to be regarded as dangerous to persons susceptible of scarlatina. This caution is of particular importance with regard to schools; and the neglect

of it when children return to school, after they have had slight scarlatina, is often a principal source of epidemic infection in districts. Intercourse from houses in which there is scarlatina with other houses should not be more than necessary; especially children from infected houses (who often may themselves be breeding the disease) should not be allowed to frequent schools and other assemblages of young people.

The bodies of persons dead of scarlatina should be buried with the least possible delay, and should not ever, in the meantime, be kept in rooms inhabited by living persons.

When scarlatina has ended in a house, the sick room should be thoroughly cleansed and disinfected before being again used by healthy people.

Chemical disinfectants are of two great classes, and hitherto it is not certain which of the two classes acts best. The one class is well represented by *chlorine and certain of its compounds*; the other is well represented by *carbolic acid*. Under the one system, the solution of chloride of lime may be used for minor domestic purposes, and chlorine gas for disinfection of rooms. Under the other system, carbolic acid may be used for minor domestic purposes, and sulphurous acid gas for disinfection of rooms. These systems do not combine well with one another; and in the choice which has to be made between them, it will be convenient that the local authority should declare which of the two systems it adopts, and that all private disinfection in each district should follow such lead of the authority. The detail in each case will be advised by the medical attendant. In public disinfection establishments (under section 23 of the Sanitary Act, 1866,) for the disinfection of wearing apparel, bedding, curtains, and other large household articles, the most convenient process consists in employment of high degrees of heat.

#### SUPERVISION OF LOCAL NUISANCE-JURISDICTIONS AND WATER-SUPPLIES.

During the year 1869 there were 41 cases where my Lords had to communicate with the respective local authorities on questions of common sanitary administration; almost invariably with reference to outbreaks of typhoid fever and other diarrhoeal infections, or to existing local conditions which justified an expectation of such outbreaks. In 20 of these cases, local inquiry by an inspector under their Lordships' directions was deemed necessary; viz., with immediate reference to typhoid fever, at *Spinkhill* and *Barlborough* near Chesterfield, at *Scothern* and *Ingham* near Lincoln, at *Cockfield* and *Gainford* and *West-Auckland* in the county of Durham, at *Audley* and *Allsager-Bank* in the Potteries, at and about *Wombwell* in Yorkshire, at *Dorking* in Surrey, at

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into sanitary  
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into sanitary  
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*Wicken-Bonant* in the Saffron Walden union, and at *Coven-try*;—with immediate reference to typhus as well as typhoid fever, and on a subsequent occasion with reference to questions of medical relief for the sick, at *Merthyr Tydfil*;—with reference to questions of polluted water-supply, at *Bridge-water* and at *Burley in Wharfedale*;—with reference to dangerous neglects in sanitary administration, at the towns of *Stamford* and *Wakefield*, at *Watlington* in the Henley-on-Thames union, at *Brimington* in the Chesterfield union, and at *Silsden* in the Keighley union. In relation to the last-named two places particular motive was given for the inquiry by the existence of very severe scarlatina. Inquiry by one of their Lordships' inspectors was also made in 1869 at the *Female Orphan Asylum, Beddington, Surrey*, with reference to a serious outbreak of typhoid fever which had affected 50 of the 153 young inmates of that establishment. And to the above enumeration I have to add that an important inquiry was made by my Lords in 1869, with reference to certain accusations which had been brought against considerable sections of the commercial *Water-Supply of London*.

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relation to  
disease.

1. The circumstances which alone enable typhoid fever and most other diarrhoeal infections to become epidemic or endemic in this country are now so well known to the educated parts of the public, and have so very frequently been illustrated in my previous reports by detailed analyses of particular cases, that I no longer think it necessary to expatiate anew on their disgusting particulars in connexion with each year's new illustrations. The experiences of 1869, substantially uniform with one another, and equally in accord with previous observations, repeat again and again the general lesson, that the infections here mentioned denote excremental poisoning. The details are of course not identical: yet even in them the limits of local variation are narrow: and the differences are in fact little more than whether the filthy infection has been embodied in air or in drinking-water. Sometimes we find, as at the *Beddington Orphan Asylum*, that unskilled arrangements for house-drainage, causing the very mischief they are meant

to avert, admit into the interior of dwellings larger or smaller eruptions of sewer-air; sometimes, as in the lamentably instructive case of *Wicken-Bonant*, we find a source of drinking-water fatally infected in ways which have escaped popular suspicion; sometimes, with such brutal habits as the inspector found permitted at *Wakefield*, "even in broad daylight people" are seen easing their bowels into the beck which afterwards "supplies them with drinking-water;" and but too often, as was illustrated this year by most of the epidemics on my list, not even a pretence of decent cleanliness is shewn in such matters as are here in question, but excrement and all other sorts of animal and vegetable refuse are so stored in putrid heaps and soaking pondage about the dwellings and beside the wells, that they pollute impartially both air and water, and infect the human body by every channel of communication.

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disease.

In each of the above cases, my Lords of course represented the state of things to the authority locally answerable for it, and did what lay in their power to procure its immediate amendment. It is lamentable however to know that any good which the public health may thus have gained during the year bears but an infinitely small proportion to the total needs of the public in the same matter. The above cases were but a few samples, accidentally disclosed, of evils which no doubt are almost everywhere present in greater or less amount throughout the length and breadth of the country; evils, which in their worst degrees often, very often, involve such filthiness of life as can only be stigmatised as bestial; but against which, in the present state and circumstances of the law, my Lords cannot pretend to be able to take systematic and really effective action. And yet, from the continuance of such conditions, the inhabitants of this country are sustaining damage year after year to a really appalling extent. The deaths are but a part of the mischief—for that needless warfare against human life has its wounded as well as its killed—yet even the deaths are in myriads. The 15–18,000 deaths by typhoid fever, which annually occur in England, are essentially due to such conditions: on such equally

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relation to  
disease.

depends the power of imported cholera to become epidemic among us: and, of the 15-30,000 deaths per annum which are registered as due to our ordinary diarrhoeal diseases, a very large proportion are undoubtedly of the same source. Moreover though, beyond this point, the admixture of causes is too intricate for equally exact proofs to be possible, it is not for a moment to be supposed that the above-described terrible causation of fatal bowel-infections is the only mode in which excremental mismanagement affects the public health. Of the mortality of young children, not referred to bowel-infections, probably a very large share (much of it registered as "convulsions") is due to excremental poisoning; and it seems highly probable that many zymotic diseases, besides those I have mentioned, find in similar circumstances their amplest opportunities for mischief. All this, in substance, is an old story. It has long been among the most fixed of the certainties which have relation to civilised life, that, wherever human population resides, the population cannot possibly be healthy, cannot possibly escape recurrent pestilential diseases, unless the inhabited area be made subject to such skilled arrangements as shall keep it habitually free from the excrements of the population. In contrast with the fact that our reckless non-provision of such arrangements costs us annually some tens of thousands of lives, it is nevertheless certain that in England for the last twenty-two years the provision of such arrangements has been deemed proper subject-matter of public law, and that for the last four years enactments have been in our statute-book which purport most compulsorily to enforce them. The circumstances under which the intentions of our law are practically for the time almost inoperative, were explained in my last year's report, and have remained to the present time substantially unchanged. Probably the period is now not distant, when the Royal Sanitary Commission will have presented its report as to the reforms which the law requires, and when the wisdom of Parliament may be expected to provide an adequate and final remedy for evils so immensely great.

Contrivances  
for preventing  
excremental  
nuisance.

Meanwhile, both with the view of aiding local authorities to a better discharge of their duties in relation to the present

subject-matter, and also with reference to discussions which might probably arise when certain details of the new sanitary law should have to be settled, my Lords thought it expedient, during 1869, to collect all procurable information as to the various special contrivances which are in use in Great Britain (other than ordinary water-closets) for preventing excremental nuisance, and as to the measure of success which each such contrivance attains. Accordingly, under their Lordships' directions, extensive local inquiries were made, the results of which are stated in the two annexed reports: the one, by Dr. Buchanan, on the *dry-earth system* of dealing with excrement; the other, by Dr. Buchanan and Mr. Radcliffe conjointly, on the *midden-closets, pail-closets, and water-supplied trough-closets*, of the poorer districts of certain northern towns. It is not necessary for the purposes of the present report that I should here attempt to weigh at all exactly the comparative merits of these various arrangements; but the broad results which I would wish to bring into relief, as for legislative purposes all-important, are: first, that local authorities, willing properly to exert themselves for the prevention of excremental nuisances, have at their disposal various ways by which that end can be more or less perfectly attained; and secondly, that a law, imperatively refusing to tolerate such sorts of nuisance, does not, in its relation to local authorities, represent a claim for wonderful exertions or lavish expenditure, but a claim which, even where circumstances are least favourable, can be easily and ought to be cheerfully met.

2. The circumstances under which my Lords made inquiry in 1869 with regard to parts of the commercial water-supply of London were as follows. Professor Frankland, the eminent chemist who habitually observes the London waters, and the results of whose observations are published monthly by the Registrar-General, had for some time found abundant evidence of defective filtration in a great part of the supply. The water, I need hardly say, ought invariably to answer to the epithets "clear and transparent;" but, during the two years 1867-8, only two of the eight London companies had been

Complaints  
against London  
water.



Complaints  
against London  
water.

found pretty uniformly to give such water; these two being the West Middlesex and the New River companies. Of companies distinguished in an opposite direction, the Southwark-and-Vauxhall company had been incomparably the worst offender; of the twenty-four monthly reports made on its waters during those two years, 22 had described the water as more or less turbid. In the same twenty-four reports, the like blame has been found attaching to the water of the Grand Junction company 7 times; to that of the Chelsea company, 8 times; to that of the Lambeth company, 9 times; to that of the East London company, 11 times; and the Kent company's water, on which only sixteen reports had been made, had, on half of these occasions, been more or less censured. Meanwhile the West Middlesex company (which yet draws from the same part of the Thames as the Southwark-and-Vauxhall company) had been reported only once, and the New River company only twice, to be giving water described as "slightly turbid." Of the 68 occasions on which waters had been called turbid, there were 40 on which the turbidity had been called "slight." Of the 28 occasions when it was more than slight, the blame attached 3 times to the Chelsea water, 4 times to the Grand Junction water, 5 times to the Lambeth water, and 12 times to the Southwark-and-Vauxhall water; and the epithet "very turbid," used altogether eight times in the twenty-four reports, was applied twice to the Chelsea water, three times to the Lambeth water, and three times to the Southwark-and-Vauxhall water. It was evident that several of the companies had been acting in habitual contravention of the Metropolis Water Act, 1852, by delivering their supplies of water without such filtration as the law requires; and in the spring of 1869, when the matter came particularly under notice of this department, the Southwark-and-Vauxhall company and in a less degree the Lambeth company (companies which between them supply more than a fourth part of the entire metropolitan population) were still in a high degree incurring the same sorts of censure as during the long preceding period. Their waters were described as containing live organic forms, and as being, in January and February, so very turbid as to be "entirely

"unfit for domestic use without previous filtration." Against the Southwark-and-Vauxhall company there further lay the extremely serious suspicion, that in the autumn of 1868 it had actually distributed to its customers tidal water drawn from the Thames at Battersea, and had thus disobeyed the Act of 1852 in a matter of supreme importance to the public safety.

Complaints  
against London  
water.

Under the above circumstances, and recognising as certain that the intentions of the Legislature, in regard of the metropolitan water-supply, were not being properly fulfilled, my Lords thought it necessary, in the interests of the public health, to have a full investigation of the matter. The inspector to whom this duty was assigned was Mr. Radcliffe, who in 1866 had most ably investigated the operations of the East London water-company, in connexion with the cholera epidemic of that year. He was instructed to inquire particularly into the working arrangements which had enabled the Southwark-and-Vauxhall and Lambeth companies (being the two companies now chiefly impugned) to distribute such waters as had been complained of; and, as he would necessarily have to compare these working arrangements with those of the other companies drawing from the Thames, he was incidentally to report also on the latter; but the works and arrangements of the three companies which do not draw from the Thames (the New River, East London, and Kent companies) were not to be included in the inquiry. Mr. Radcliffe's thoroughly complete and conclusive report on the results of his examinations is subjoined (Appendix) *in extenso*, and I need not here do more than refer to its general verdict.

First, as regards the facts of turbidity, Mr. Radcliffe found Dr. Frankland's assertions abundantly confirmed by others; and especially as regards the Southwark-and-Vauxhall company, he found the officers of health in districts where the water was supplied writing of it as having been "almost uniformly throughout the whole of last winter very turbid and of a yellow colour," and comparing it "to diluted pea-soup or to a yellow November fog," or describing it as "during the winter and spring very much stained and marly,"



Complaints  
against London  
water.

and when received direct from the mains into the Bermondsey public baths, "frequently quite useless, although the company have put a strainer on the supply-pipe to keep back dead fish and other matters, which show the unfiltered state in which it is often delivered." And even after Mr. Radcliffe's inquiry, Dr. Sanderson of this department, on making microscopical examination of the two waters, found both of them characterized in a way which, in the light of present medical knowledge, seems to me of very bad significance: *i.e.*, not only containing such larger organic forms as may merely represent defective filtration, but also infested by those extremely minute actively-moving particles (apparently the *microzymes* of our contagion research) which, if not at present to be identified as actual seeds of disease, at least "probably afford proof that chemical decomposition is in actual progress, and that the water containing them is in such a state as to be improper for consumption."

Next, as regards the causes of the turbidity, Mr. Radcliffe found two sufficient explanations for the frequent or habitual delivery of turbid water by the Southwark-and-Vauxhall and Lambeth companies: first, that the works had not provided sufficient extent of filtering surface; and secondly, that the works had not enabled sufficient time to be allowed for subsidence, preliminary to filtration. In the case of the Southwark-and-Vauxhall company (which before Mr. Radcliffe's inquiry had taken measures to remedy the above deficiencies) the deficiencies had been of the worst effect, that, owing to the company's further want of service-reservoirs, the rate of filtration had had to be very greatly accelerated during the hours of maximum supply. And in the case of the Lambeth company, there had been also a special disadvantage in the fact that this company (in common with the Chelsea company) draws its supply of water from a part of the Thames which is peculiarly apt to be turbid. Mr. Radcliffe further concluded that in the case of the Southwark-and-Vauxhall company, the turbidity had certainly in some cases been caused by the admission of unfiltered water from the subsidence-reservoirs direct into the pump-wells for distribution, and probably in certain other instances by the

Complaints  
against London  
water.

admission of tidal water from the Thames. With regard to the latter most condemnatory opinion, he admits that water may have accidentally soaked or leaked from the river at Battersea-Reach; but he also particularly points out that he found the company still maintaining the old conduit by which, prior to 1855, it normally filled its reservoirs from that part of the river. I think it on the whole probable that the company is not guilty of having intentionally drawn tidal water from the Thames: but, that it intentionally distributed unfiltered water from its subsidence-reservoirs, and at least negligently received an admixture of tidal water from Battersea-Reach, cannot, I think, be disputed. Of course, as regards any possibility of accidental leakage or soakage from the river, the company's works ought to be so constructed that no such accident could happen. And as regards the possibilities to intentional malfeasance in either of the respects here referred to, I quote, with entire concurrence, Mr. Radcliffe's practical suggestion:—"It should be required absolutely of the company that the communication of the reservoirs at Battersea with the tidal portion of the Thames, by means of the old conduit leading to Battersea-Reach, and the direct communication of the subsidence-reservoirs with the pump-well, should be entirely cut off. Any contingencies that might arise which would apparently at the moment justify the company, as a matter of expedience, and notwithstanding the illegality of the acts, in taking water into their reservoirs through the conduit communicating with the tidal water of the Thames, or in permitting unfiltered water to pass directly from the subsidence-reservoirs into the engine wells for distribution, can be provided for in other and more legitimate modes."

It seems to me, however, that in connexion with the above case the public has some further points to consider; and though I have perhaps on other occasions sufficiently acquitted myself of my duty to bring such points under consideration, yet, having regard to the extreme importance of the matter, I venture once more to insist on them.

Water supplies  
generally, in  
relation to  
public health.

Water supplies generally, in relation to public health.

The doctrine, in general terms, that a vast influence is exercised over the health of communities by the quality of the water which they consume, is one which, as far back in literature as any reference to such questions could be expected to exist, may be seen to have universal medical consent in its favour; and, during long ages of history, the common instincts of mankind were even surer and stronger than undeveloped science could be, in revolting against the use of unwholesome waters: so that (for instance) among the lessons which survive to modern times from the wonderful intellect and vigor of ancient Rome, the frequent far-reaching aqueducts, which record an unbounded care for the provision of proper urban water-supplies, are monuments kindred in spirit, and only second in dignity, to the consummate system of jurisprudence of the same singularly organising people. Of the many invaluable additions and improvements which medical knowledge has received within the last quarter of a century, scarcely any can in my opinion be compared, for present practical importance, to the discoveries which have given scientific exactitude to parts of the above-stated general doctrine, and have enabled us definitely to connect the epidemic spread of bowel-infections in this country with the existence of certain faults of water-supply. Not only is it now certain that the faulty public water-supply of a town may be the essential cause of the most terrible epidemic outbreaks of cholera, typhoid fever, dysentery, and other allied disorders; but even doubts are widely entertained whether these diseases, or some of them, can possibly attain general prevalence in a town except where the faulty water-supply develops them. Within the last few years these truths have again and again been set before the public; but, as the tragedies which illustrate them are too often forgotten as soon as acted, some present recapitulation of past experience may be permitted me.

Relation of cholera to water-supplies.

(a.) In 1848, when the second great Cholera-visitation of England was impending, the then Metropolitan Sanitary Commissioners, in publishing the information which they had obtained concerning the habits of the disease, quoted that in

Moscow, the year before, the epidemic in the sixth week of its existence was observed to have confined itself principally to districts south of the river, where the population had only the impure river-water to drink; the cases in the northern districts, where an excellent water-supply had been provided, having been but few and scattered; whereas, in the epidemic of 1830, when the northern districts had not yet obtained their better water-supply, cholera "extended to every part of the town in 17 days, and reached its maximum (118 deaths per diem) after a duration of one month."

Relation of cholera to water-supplies.

(b.) In the autumn of 1849, at the height of our terrible second epidemic, Dr. John Snow, in an admirably lucid and original little paper contributed by him to a medical journal, advanced the doctrine which has long been identified with his name, that cholera propagates itself from person to person by means of the intestinal discharges of the sick; and he claimed for this doctrine that it gave the true explanation of the influence which sewage-polluted water had been seen to exercise, and was, he believed, in London at that moment exercising, to determine the local distribution of cholera. Dr. Snow, in 1849, was not able to furnish proofs of his doctrine: against which, too, at first sight some strong arguments seemed to hold: but afterwards (and happily in great part before his premature and lamented death in 1858) distinct experiments, as well as much new collateral information, established as almost certain that his bold conjecture had been substantially right.

(c.) In 1853, our share in the third great cholera-visitation of Europe began with a frightful epidemic at Newcastle and Gateshead, which killed in a few weeks nearly 2,000 persons out of populations not amounting to 120,000; and when Her Majesty appointed commissioners (Mr. Joseph Burnley Hume, Mr. John Frederic Bateman, and myself) to inquire into the causes of that epidemic, it was found that the water-company supplying the two towns had at the time very improperly been drawing about a third part of its supply from the tidal and refuse-receiving Tyne. The commissioners reported, "We cannot but come to the conclusion that the water was such as ought never to have been distributed,

Cholera in Newcastle in 1853.



Cholera in  
Newcastle in  
1853.

"and that, on the most favourable view we can adopt, it must be regarded with grave suspicion in relation to its influence on the late outbreak . . . It is matter of history that in the two cases in which cholera has raged violently in Newcastle, viz., in 1831 and 1853, the water supply has (owing to a sudden failure of other sources) been more or less derived from the Tyne, and that in the third case, in which the supply of better water continued abundant, viz., in 1848-9, the outbreak of cholera was light and mild; and further, as a coincidence, if nothing more, that [in 1853] on the fifth day after the company ceased to draw from the Tyne, and within a still shorter period after the time when all admixture of Tyne water in the pipes and reservoirs of the company will by perpetual dilution have passed away, the late outbreak of cholera did certainly commence a rapid and never-checked decline."

Cholera in  
London in  
1853-4.

(d.) In 1854, when cholera prevailed with great severity in London, Dr. Snow urgently insisted on local illustrations which he was able to show, and which were now beginning to be commonly recognised, of the broad connection of the disease with water supply. One case to which he particularly drew attention, and which afterwards was exhaustively examined by a local committee, was the relation of a particular well in the neighbourhood of Golden Square, and much used in that neighbourhood, to a cholera-outbreak of extraordinary vehemence in the parish of St. James's, Westminster; and another fact on which he insisted, and which eventually became most conclusive for purposes of demonstration, was that, whereas throughout one very large section of the metropolis two water-companies were supplying different waters, the customers of these two companies were suffering in widely different proportions from the epidemic. At that time I had the honour to be associated with many eminent members of my profession in a Medical Council, which the president of the then General Board of Health had convened to advise him in relation to the epidemic; of which council a Committee (consisting of Dr. Arnott, the late Dr. Baly, Dr. Farr, Professor Owen, and myself) was requested to suggest and supervise such scientific inquiries about the disease as might probably

elucidate its nature and causes; and this committee, having had its attention drawn to the last-mentioned very remarkable inequality of cholera-distribution, recommended that the facts of the case should be further investigated, and as far as possible compared with previous experiences in the same district. Very copious details of information were in consequence asked for; but unfortunately these could not be collected before the time when the committee had to make its final report; and in 1856 it devolved upon me (who meanwhile had been appointed Medical Officer of the Board) to report on the statistics which had been compiled.\*

Cholera in  
London in  
1853-4.

(e.) In the years 1865-6, England suffered a fourth cholera-visitation. In the meantime Dr. Snow's doctrine of the mode in which cholera propagates itself had assumed scientific importance: for in 1856 Professor Thiersch, then of Erlangen, had proved, by direct experiments performed on lower animals, that the infection of cholera can operate in the way which Dr. Snow supposed; and consequently, during our fourth visitation, attention was given more vigilantly than before to the influence of foul water-supplies (particularly of water-supplies infected with specific contagium) in promoting epidemics of the disease. Two cases of special importance were observed: one relating only to a private well, while the other related to a great London water-company; and I shall here describe both of the cases, as the minor of them serves to throw light on the major.

Cholera in  
London in  
1865-6.

The former is detailed in my eighth report. In the summer of 1865 cholera approached us from the Mediterranean; Egypt had been badly infected by Mohammedan pilgrims returning from Mecca; the infection had spread along the lines of steamboat communication which diverge from Alexandria as a centre to all the most considerable ports of the Levant and of southern Europe; and presently, as was expected, a first wave of the infection touched our shores. For the first time in our experience the attack was on our south coast. [For particulars of this instructive case, see above, pp. 226-30.]

Theydon Bois  
cases.

\* On the two Cholera-Epidemics of London, 1848-9 and 1853-4, as affected by the consumption of impure water, Vol. I., pp. 411-24.--J.S.



East London  
Cholera  
epidemic in  
1866.

The second case to which I have to refer as belonging to our fourth cholera-visitation, is that of the East London water-company, in relation to the great cholera epidemic of 1866. This case was very minutely examined under direction of the Lords of the Council; and the admirable statement which their Lordships' inspector, Mr. Radcliffe, made of the results of his elaborate inquiry is given, together with some observations of my own, in the appendix to my ninth report. The water-company, through its engineer, acknowledged to having acted in contravention of the law, by distributing for public use a water, and a most improper water, which had not passed through its filter beds; and Mr. Radcliffe's inquiry led him to conclude that this water had caused the epidemic. There were some difficulties in the case which I confess myself not to have been able to explain fully to my own satisfaction; but the broad conclusion, that the East London water-company caused the East London cholera epidemic was supported, in my opinion, by almost irresistible arguments; and I give Mr. Radcliffe's verdict in the words in which he closes his report on the fourth cholera-visitation of London:—

“The outbreak in the metropolis was one of a succession of phenomena which indicated a wide-spread diffusion of cholera infection in the kingdom during the month of June 1866, and this diffusion was inseparably connected with a direct dissemination of the infection from the Continent. The earliest unquestionable cases of the outbreak took place on the 26th June 1866, . . . . and the outbreak reached its acme in the fifth week following. The mortality among the population was proportionately less from this outbreak than from any previous outbreak in the metropolis, but the disease was not less fatal in proportion to the number of persons attacked. Of the mortality of 5,915 no less than 4,276 occurred in the east districts of the metropolis and adjacent suburban districts of West Ham and Stratford. It was in these districts that the disease underwent the rapid and unexampled development which gave to the outbreak such formidable proportions in the fifth and sixth weeks of its duration. The unusual development of the epidemic in the east districts, as compared with the rest of London, began in the week ending the 14th

July; in the week following the rate of increase, as compared with the previous week, was nearly *seven* times greater than in the rest of the metropolis; but in the subsequent week the rate of augmentation became virtually the same over the whole of London. Neither the meteorology of the period, nor altitude, nor the nature of the soil, nor density of population, nor filth, nor the state of the sewerage, nor locality, affords any explanation of the peculiar localization of the outbreak in the east district. There is but one condition known which might become capable of propagating cholera common to the whole area of the outbreak, namely, the water-supply. The sudden and virtually contemporaneous development of the outbreak over the entire area of prevalence indicated a medium of propagation common to, and capable of, rapid diffusion over the whole area; its sudden declension indicated the temporary efficiency to this end of such a medium. The area of prevalence approximated with remarkable closeness to a particular field of water-supply, and there are facts which seem to prove that this approximation was not accidental. It is known that, immediately prior to the outbreak in the east districts of the metropolis and neighbouring districts across the Lea, impure water was distributed over this field of supply, and it is highly probable that this water was charged with choleraic poison. It is submitted that these facts and inferences supply a sufficient and legitimate explanation of the great and explosive development of cholera in the east of London and its suburbs during the recent outbreak; and it is argued in respect to a serious objection to this theory, arising out of the actual or relative immunity from cholera of certain districts and institutions supplied with the suspected cholera-infected water, that in the present state of our knowledge of the outbreak, the positive and more generally applicable facts may justly, and for practical purposes, warrant a conclusion apparently in contradiction with certain negative facts of much more restricted application.”

Hitherto I have spoken only of cholera, but another and even more important disease claims also to be mentioned. Among the circumstances which we find associated with outbreaks

East London  
Cholera  
epidemic in  
1866.

Typhoid fever  
epidemics.

of Typhoid Fever, there is none of more frequent occurrence, none which we are more entitled to consider directly causative of the disease, than the consumption of polluted water. It has been one of our most familiar experiences, one which my reports for many years past have again and again been obliged to exhibit in all its nauseous details, and which in the present report receives a new and striking illustration, that excremental fouling of wells is, in this respect, among the worst dangers which can threaten the health of a community; and it might be assumed that other common water-supplies, as distributed by companies and local boards, would equally be capable of spreading the infection. Cases to this effect have not yet accumulated in regard of typhoid fever as abundantly as in regard of cholera, but from my 10th report I beg to quote an illustration which doubtless will be deemed sufficient.

Unprotected-  
ness of the  
public against  
water-com-  
panies.

From this long digression on the general question of the influence of foul water-supplies on the distribution of certain epidemic diseases, I return to the particular question of the water-supply of this metropolis. I have been anxious to show, even if redundantly, what enormous risks to the public are implied in any slovenly administration of such supplies; yet, as regards the London supply, what imperfect obedience to the law, and in some cases what systematic and flagrant disobedience, was exhibited during the time to which Mr. Radcliffe's inquiry referred; and, above all, what criminal indifference to the public safety was illustrated by the proceedings of the Southwark-and-Vauxhall Company. In the case of this company, not only had there been the long-standing gross insufficiency of the apparatus of subsidence and filtration: an insufficiency which at length, under continued pressure from without, is said to have been for the time amended: but, worse, the administrators of the supply had from time to time, as they found convenient, dispensed to a great extent with even a pretence of filtration, and during part of the time under review had, worst of all, either negligently or wilfully distributed as part of their supply the interdicted tidal water of Battersea-Reach. What might have been the result of these malfeasances, if cholera-infection had

at the time been in London, the reader of my previous pages can judge. In those pages are stated some of the dreadful antecedents of this very company in that same relation to human life; homicidal antecedents, on a really stupendous scale; antecedents, as to which the company might no doubt urge in extenuation that, till 14 years ago, the injuriousness of its then water-supply was unproven; but as to which, since the report of 1856, the damnatory proof has been absolute. And this company, with those antecedents, is now found the worst offender against the too lenient Act of 1852; experimenting again, as though its previous experiments had been inconclusive, on the lives of some hundreds of thousands of people; and apparently trusting (but may be with an ill-founded trust) that the forgetfulness or indifference of public opinion will condone also this iniquity.

My duty to the public obliges me most urgently to represent the extreme inadequacy of the law, in its present state, to provide for the public safety against such perils as are here under consideration; and in this context I beg leave to repeat the language which I used three years ago, when referring in my ninth report to the then recent calamity of the East London cholera epidemic, as connected with an illegal and most culpable act of the East London water-company. [See above extracts from Ninth Report, pp. 287-9.]

Finally, with reference to all the subject-matters of this section of my report—matters of nuisance-jurisdiction as well as matters of public water-supply, and in view of the fact that at the present time, under Her Majesty's Commission, the whole sanitary law of this country is being systematically reconsidered, I beg leave to terminate this section by submitting again for consideration what I said in my tenth report on the general question of responsibility in matters of common sanitary concern. [See above, pp. 331-4.]

Question of  
pecuniary  
compensation  
for persons  
injured by  
breaches of  
sanitary law.



## AUXILIARY SCIENTIFIC INVESTIGATIONS.

Auxiliary  
scientific  
investigations.

The pathological work of the department was in 1869 carried on as usual in its two branches; and the subjoined reports [A] by Dr. Sanderson and Dr. Thudichum will shew that it was in matters of the utmost interest. The work represented in the two reports is undertaken from two opposite points of view; and the investigators cannot at present act in precise concert as to its details; but though now the respective shares of work are in a certain sense independent of each other, it may be anticipated that sooner or later (as in some great sub-alpine tunnelling) the approaches thus oppositely begun will meet and become mutually subservient. Dr. Sanderson's work, advancing from the ætiological side of the subject matter, has during the year broken ground in singularly important studies concerning the natural history of the contagia; and Dr. Thudichum's work, which may be regarded as concluding his long series of preliminary researches introductory to the chemistry of disease, has, he believes, at length given him a basis from which he can proceed with some confidence, and with infinitely better prospects of success than before, in the task of chemically investigating individual morbid processes and their results.

The general intention of these two branches of investigation has been explained in other of my annual reports; and in the stage at which the investigations now are, the exact nature and immediate tendency of last year's work will probably be better learnt from the details of the two appended papers [A] than they can be from any more generalised description of the work, or from any hitherto possible synopsis of its results. Accordingly, I confine myself here to such notice of the two reports as may serve to indicate the point of view from which each of them has to be read.

Natural history  
of contagia.

1. First, as regards the *ætiological work*, Dr. Sanderson, in 1869, as I have said, began researches in a new direction. We believe that at last it has become possible, with the assistance of the microscope, to make direct studies of the

intimate nature and natural history of the contagia; and so far as this is true, the scientific and practical interest which must attach to such studies is transcendently great. No doubt it would be a mere enthusiasm to think of the possible far-off knowledge of these things as if the scientific labours of a year or two could attain it, or even as if each fragment of the knowledge, on being attained, must be capable of immediate popular application; but, that such knowledge as is here in question must sooner or later, if it can be attained, be of the largest conceivable advantage to mankind, is a certainty which science cannot fail to see, as its own great encouragement to labour, and which indeed anyone can fairly appreciate with but little technical information. Looking at the ravages which are every day suffered from familiar diseases of the zymotic class, such as typhoid fever, and typhus, and small-pox, and scarlatina, and measles, and hooping-cough; and adding to these the less constant, but occasionally terrible, destructiveness of diphtheria and of cholera; adding further the consequences of venereal diseases; adding again those serious traumatic infections which make the chief common danger of surgical operations and injuries; every one can see that the field of zymotic pathology (throughout which, notwithstanding all present resources of preventive medicine, there is urgent need of the exacter knowledge here spoken of) is of enormous extent and incalculable importance. But in fact the field where such exacter knowledge may be fruitful is many times larger than that enumeration would suggest. Even as regards man, recent researches suggest as in the highest degree probable, that the domain of our zymotic diseases is much larger than has been supposed; that, for instance, very possibly tubercle, and not impossibly even cancer, may each pre-suppose, as one of its essential factors, the existence of some ferment which first operates on the human body from without. And then let it be remembered, as we regard all this immense field of human suffering, that man is but one of innumerable forms of life subject to similar devastation. Every domestic animal may be expected to benefit, equally with man, from the growth of genuine scientific insight

Natural history  
of contagia.



Natural history  
of contagia.

in matters of zymotic pathology; and questions of quite equal importance in relation to the most useful parts of the vegetable kingdom are either themselves questions of zymotic pathology, or questions which may be very greatly enlightened as the knowledge of animal contagia extends. Direct studies of the intimate nature and genesiology of the most tremendous causes of disease are, then, the studies which are here in question; and, with the estimate which I have of the importance of such studies, I am particularly glad to report that our scientific work of the year includes a beginning of labour in this direction. Our ætiological investigations of tubercle, described in my last two reports, had (from two or three different directions) led us to confines where it seemed we were entering on questions of zymotic pathology. And so, doubting whether even with tubercle more ætiological knowledge could be got till the morbid ferments should have been better studied, we in 1869 began the latter study. Dr. Sanderson's present report does not pretend to be more than introductory in the matter. It discusses generally the ultimate constitution of the contagia; shewing experimental reasons, which we think conclusive, for believing that each contagium, as regards its physical form, consists essentially of *extremely minute separate solid particles*; and arguing, on grounds which we think scarcely less certain, that these effective particles of each specific contagium are *living self-multiplying organic forms*.\* In my annual report of six years ago, when incidentally I had occasion to refer to the intimate nature of morbid infection, I quoted, as of extreme interest to that question, the experiments of Prof. Schröder and M. Pasteur on the ordinary processes of fermentation and putrefaction; experiments, purporting to connect each specific fermentary or putrefactive change with the presence and self-multiplication of some characteristic form of microscopical life; but at that time,

\* In this report, where I have made much reference to the late Dr. Snow's theory of cholera, it may be proper to note that he, believing the cause of the disease to be a *contagium vivum*, attributed to it "the property of reproducing its own kind" in the intestinal canal of patients infected by it.—J.S.

though I could claim for zymotic pathology the utmost interest in an extension of these experiments, I was obliged to admit that "the conclusiveness of the experiments, in the field to which hitherto they have been confined, is still matter of the warmest scientific controversy."\* It will now be seen that the views indicated in Dr. Sanderson's report with regard to the agencies of morbid infection are (*mutatis mutandis*) the views of Prof. Schröder and M. Pasteur on the agencies of fermentation and putrefaction; and I think it will be admitted that the latter views are importantly strengthened by the evidence which M. Chauveau and Dr. Sanderson supply from their other sphere of study, and with experiments of a new and critical kind, as to the essentially particulate form in which the morbid ferments exist and multiply. Professor Hallier's very striking doctrine, that contagium-particles, or (as we propose to call them) *microzymes*, are the respective micrococci of certain higher fungic forms which he names, and into which he maintains they can be artificially cultivated, is fully set forth in Dr. Sanderson's report, but has not yet come under our experimental examination. Knowing that all contagia (as such) are distinct one from the other, and believing that each of them has its essence in the so-called microzymes which it contains, we by implication impute to the microzymes that in different diseases they are not identical; and as we affirm them to be dynamically different, so also we assume that, under well-devised differential experiments, other signs of their specificity may be brought to light, and for each sort of them a definite genesiology be written. Hitherto, however, no work has been attempted by us but such as is more or less common to all contagia. And the extremely difficult task of devising the differential experiments which may settle this new branch of natural history is among the obligations of the future.

2. Secondly, as regards the *chemical work* of the department, I have mentioned that a considerable succession of

Chemistry of  
disease.

\* See extracts from Sixth Report, especially in the foot-notes at pp. 151-2.—J.S.

Chemistry of  
disease.

researches, which for the most part had been rather preliminary than pathological, was ended by Dr. Thudichum in 1869. The most important chemical problems concerning zymotic disease are problems of modified bodily decomposition—"modified," namely, as compared with that normal decomposition which every living body continuously undergoes; and it is of course an indispensable condition for being able to measure the morbid modification, that the normal or unmodified processes of decomposition shall first be accurately known. The investigations of previous observers in the latter field of research had not nearly reached the degree of development in which they could furnish complete standards of comparison for the products and processes of disease; and consequently Dr. Thudichum, before he could hope to make any progress with the chemical study of such diseases as typhus and scarlatina, had in various points to work out standards for his own use, and in several cases incidentally to improve the methods of procedure by which this kind of work is done. Thus it has been, that, of the chemical and spectroscopic researches hitherto made, the larger proportion have related systematically to the ordinary constitution and decomposition-products of the blood, bile, and urine, and to other kindred subjects; while, with exception of the large cholera research made in 1866, the direct investigations of disease have been fragmentary.\* From the systematic prosecution of the former or physiological sort of researches Dr. Thudichum believes he has learnt to identify, and in many cases to know in considerable detail, a large number of previously unknown organic compounds;† and it must be obvious that, so far as this is the case, previous pathological researches within any sphere to which these compounds belong

\* The chief of the latter investigations have related to points of importance in the chemical pathology of malarious fever, tetanus, hydrophobia, morbus addisonii, intermittent cruenturesis, waxy degeneration, diabetes, and chronic liver atrophy. And one of them related to the physiological relations of alcohol.—J.S.

† Besides the new products described in the urine, and 7 new coloured ingredients of gall-stones, there are 18 new derivatives of hæmato-crystalline, and 6 new decomposition-products of albumen, and long lists of organic yellows other than of bile and urine, all named in Dr. Thudichum's papers, as having been for the first time identified, and in some cases extensively investigated, by him.—J.S.

would of necessity have been unsuccessful. Dr. Thudichum's appended report of last year's work may, in the sense of these observations, be referred to as especially illustrative and important. The continued elaborate studies of the products of albuminous decomposition (illustrated on this occasion by the papers on leucin, leucimide and tyrosin, and especially by those on the newly-observed volatile alkalies of such decomposition) represent work which, with that of two years ago on fluorescentine and other new decomposition-products of albumen, may hereafter be of the most important bearing on the detailed symptomatology of febrile diseases, and is evidently such as required to be undertaken before the poison-symptoms of fever could be rationally investigated. Even greater interest, however, attaches to some other studies which are now reported on: namely, to those concerning the chemistry of the urine: for the last paper of the series alleges, as its discovery, in relation to the normal constitution of the urine, that an ingredient which is the free acid of the secretion, and which in quantity constitutes about a fifteenth part of its entire solids, has hitherto been overlooked or misunderstood; and since in all diseases, acute and chronic, as well as in health, the urine is habitually referred to by pathologists, as measuring for them by certain of its ingredients the waste of nitrogenous material in the body, this paper of Dr. Thudichum's, besides being of fundamental interest to the whole subject-matter of our particular researches, must also, if its conclusions are accepted, be turned extensively to account for the immediate uses of medicine. Briefly, then, the chemical work of the past year claims to be regarded as contributing in its own province an important share to the physiological basis from which alone disease can be studied. And I may state in conclusion, that since at the date of this report we believe that basis to be sufficiently wide for the endeavour, Dr. Thudichum is now at once proceeding to the systematic and direct chemical investigation of two of the most important diseases of this country.

3. It remains for me to mention, under the present head, a minor inquiry which my Lords directed to be made in 1869, on a point of immediate and popular interest: the question,

Chemistry of  
disease.

Milk of  
diseased  
animals.



Milk of diseased animals.

namely, of effects produced on the human subject by milk derived from animals suffering with the so-called foot and mouth disease. In the autumn of 1869 this disease was on various occasions reported as prevailing among horned cattle in different parts of England; and my Lords availed themselves of some of these opportunities to cause local investigation to be made whether any human disease could be traced to the consumption of milk from the infected cows. Dr. Thorne made these local inquiries for their Lordships; and I subjoin in extenso [A] the report which he finally made of the results. I regret to state that, in spite of Dr. Thorne's ably conducted examination, the subject has not yet been quite divested of such difficulties as attach to conflicting testimony; and that in this respect no important advance has been made on the state of knowledge which I reported seven years ago.\* If I then adverted to occasions on which, "when aphtha has been prevailing among the cattle of a country, the human population in the same places has suffered from the same or from some similar disorder," and if I then mentioned, as seemingly made certain by experiment, "that at least under some circumstances the human affection may be caused by the consumption of milk drawn from a diseased animal," so, on the present occasion, Dr. Thorne reports cases where decidedly the milk of diseased animals seems to have produced human disease. But, on the other hand, just as I was formerly obliged to quote strong negative testimony from large epidemics in Paris, and to admit as possible "that the frequency of such communications of the disease, as compared with the number of persons who (more or less) are consumers of milk, is not great," so, on the present occasion, Dr. Thorne reports "that in a very large number of cases the milk of cows undoubtedly affected has been used without producing any noticeable morbid effects." We have not yet obtained any positive knowledge by which these opposite facts can be reconciled. Negative results would of course be expected where only boiled milk has been used; but from consideration

\* Fifth Report of Medical Officer of Privy Council, p. 89.—J.S.

of the evidence I think it probable that dilution of milk, and also mere lapse of time may have to be taken into account, and that milk which after dilution, or after some hours' delay, does not infect, might have infected if taken neat or fresh. The positive evidence, however, is that to which the public ought to have chief regard; and bearing this in mind, I am clearly of opinion that the milk of cows with foot and mouth disease ought not to be unrestrictedly sold for human consumption.

#### From the Thirteenth Report to the Privy Council, 1870.

[The Thirteenth Report contains sections relating to the Special Diseases of the Year; the Supervision of Nuisances Removal and Diseases Prevention Authorities; Public Vaccination, which is omitted, *vide* Vol. I., p. 393; Constitution of the Medical Profession (transferred in the reprint to the Section devoted to that subject, Vol., I., pp. 518-24); The Practice of Pharmacy (also for convenience transferred to Vol. I., pp. 553-4); Auxiliary Scientific Investigations.—ED.]

#### THE SPECIAL DISEASES OF THE YEAR.

In introduction I have to state that the two epidemic diseases which in 1869 had required particular attention from this department continued seriously prevalent in 1870: namely, that *Relapsing Fever* which at the date of my last report had scarcely excited much apprehension except in London, where then it had begun to decline, afterwards increased very considerably in other of our great centres of population—particularly at Liverpool, and, in a less degree, at Leeds and Merthyr-Tydfil; and that *Scarlatina*, which also at the date of my last report had begun to diminish in London after an epidemic of extreme severity, has till now continued ravaging other parts of England with its extraordinarily fatal prevalence. Besides these causes of anxiety in relation to the public health in 1870, there began early in the year signs of a recommencing ascendancy of *Small-pox* in England; and before the close of the year it had become evident that, at least for the three and a quarter million inhabitants of the metropolis, the severity of this epidemic of small-pox would be beyond any recent experience we had had of the disease.



THE SUPERVISION OF NUISANCES REMOVAL AND DISEASES  
PREVENTION AUTHORITIES.

Supervision  
of Nuisances  
removal and  
Diseases pre-  
vention  
Authorities.

During the year 1870 there were 200 cases where communication with local authorities was necessary in regard of questions of *common sanitary administration*; and in 66 of these cases the communication involved local inquiry by a medical inspector of the department. I subjoin (Appendix) a list of (a) the 66 cases in which inspectors' visits were made, and of (b) the 134 cases in which the communication was by letter; and this list shows compendiously on what ground in each case the department had to intervene.

It will be seen, on reference to the table, that almost invariably the matter calling for inquiry was the local prevalence of some dangerous infectious disease. It deserves notice that in the greater number of cases the local prevalence of disease became known to this department through the more detailed enumeration of deaths which the Registrar General now gives every three months, for each sub-district of England, in the admirable new series of his Quarterly Returns; and I am the more glad to point to this illustration of the utility of the detailed Returns, because it justifies the opinion which I expressed two years ago, that if such an extension could be given to the Returns, "the quarterly publication" would represent one of the most important aids which could "be rendered to the health-administration of the country."

As regards the 66 cases, where it was practicable to send a departmental inspector to the locality, the first division of the table exhibits in its last column, as briefly as possible, the conditions which in each case the inquirer found existing: conditions, in no case satisfactory, and very rarely other than of the grossest local neglect. I think it probable that the conditions, which this first division of my table exhibits with regard to the 66 inspected localities, would have been found in very large proportion in the 134 other localities, if the departmental inspection could have extended thither.

The inadequacy of the present staff of this department to supervise the local administration of the Diseases-Prevention and Nuisances-Removal laws, and to meet (or even nearly to

meet) by medical inspection the demands which are made by local outbreaks or apprehensions of dangerous infectious disease, became in 1870 extremely evident: as may here already have been inferred from the fact that inspectors visited only a third part of the number of cases where communication with local authorities was necessary: and the inadequacy would have been far more evident, were it not that, in our entire lack of public returns of (not fatal) sickness, the field where sanitary supervision is needed remains in one large part of its extent shut out of view. In these circumstances the Lords Commissioners of the Treasury approved that the Estimates (now before Parliament) for the financial year 1871-2 should include a proposal to increase the staff of this department; and the increase which is proposed, if it has the sanction of Parliament, will so far diminish the above-described defect as to enable a large part of the country to be under fair sanitary supervision.

AUXILIARY SCIENTIFIC INVESTIGATIONS.

The *pathological work* of the department was in 1870 carried on in its two branches, as described in my last year's report, by Dr. Sanderson and Dr. Thudichum respectively. In neither of the two branches of investigation is the matter of study such that results can easily be published in fragments; and on the present occasion I think it better, as regards one of the branches, not to submit the results of 1870 till they can be extended by the present year's work. But as regards the other, I am able to lay before your Lordships the subjoined report by Dr. Sanderson (Appendix) in continuation of his studies of the process of contagion; and I am glad to state, on the evidence of this report, that, even at the present very early stage of work, Dr. Sanderson's investigation is giving results which are of direct interest to the practice of medicine and surgery.

Auxiliary  
scientific  
investigations.

## Conclusion.

At the present date, when according to Statute the departmental proceedings of 1870 must be reported to your Lordships, the proceedings from day to day are such as to leave little opportunity for retrospect. An epidemic of small-pox, greatly more severe than any in the last 30 years, is prevailing throughout this metropolis; while at the same time, in virtue of an engagement made in the last Session of Parliament, a Select Committee of the House of Commons, appointed for the purpose, is taking evidence as to the working of the Vaccination Act of 1867, and as to the value of various objections which have been agitated against the practice of vaccination. These exceptional circumstances, with the large daily claims which they of course make on the staff of this department, forbid my dealing in the present report with any subject-matter which can properly be postponed. And having above laid before your Lordships, as the Statute requires, my summary of the work of 1870, I find only one further matter which in my opinion is at once so important and so urgent that, even now, I must submit it for your consideration.

I refer namely to the extremely unsatisfactory state of the laws which concern the general sanitary administration of the country: a subject, concerning which I two years ago submitted the chief facts to your Lordships, and on which the Royal Sanitary Commission has recently made its final report.

I would beg leave to represent to your Lordships that the unamended state of those laws, especially as regards the constitution of local authorities and the powers which they ought to have and exercise for the prevention of disease, is not only an extreme difficulty and discouragement to persons engaged in sanitary administration, but also involves a large and constantly-increasing waste of human life; and that since the resources which might be utilised for the better protection of life are also with the progress of knowledge constantly increasing, so, almost month by month, the contrast becomes more and more glaring, between the little which is done and the very much which with amended law might be done, to reform the sanitary circumstances of the masses of our population.

I believe that your Lordships will deem this matter to be, in various points of view, deserving of the particular notice of Parliament.

In the first place, there is the largeness of the continuing waste of human life. It seems certain that the deaths which occur in this country are fully a third more numerous than they would be if our existing knowledge of the chief causes of disease were reasonably well applied throughout the country; that, of deaths which in this sense may be called preventable, the average yearly number in England and Wales is now about 120,000; and that of the 120,000 cases of preventable suffering which thus in every year attain their final place in the death-register, each unit represents a larger or smaller group of other cases in which preventable disease, not ending in death, though often of far-reaching ill-effects on life, has been suffered. And while these vast quantities of needless animal suffering, if regarded merely as such, would be matter for indignant human protest, it further has to be remembered, as of legislative concern, that the physical strength of a people is an essential and main factor of national prosperity; that disease, so far as it affects the workers of the population, is in direct antagonism to industry; and that disease which affects the growing and reproductive parts of a population must also in part be regarded as tending to deterioration of the race.

Then, my Lords, there is the fact that this terrible continuing tax on human life and welfare falls with immense over-proportion upon the most helpless classes of the community: upon the poor, the ignorant, the subordinate, the immature: upon classes, which in great part through want of knowledge, and in great part because of their dependent position, cannot effectually remonstrate for themselves against the miseries thus brought upon them, and have in this circumstance the strongest of all claims on a Legislature which can justly measure, and can abate, their sufferings.

There are also some indirect relations of the subject which seem to me scarcely less important than the direct. For, where that grievous excess of physical suffering is bred, large parts of the same soil yield, side by side with it, equal evils of



another kind; and your Lordships will often have seen illustrated in my reports, that, in some of the largest regions of insanitary influence, civilisation and morals suffer almost equally with health. At the present time, when popular education (which indeed in itself would be some security for better physical conditions of human life) has its importance fully recognised by the Legislature, it may be opportune to remember that, throughout the large area to which these observations apply, education is little likely to penetrate unless with amended sanitary law, nor human life to be morally raised while physically it is so degraded and squandered.

The above various considerations, taken together, seem to me to invest the subject which I am bringing under your Lordships' particular notice with a degree of national importance to which very few subjects can pretend. Its relative position among such subjects is not a point on which I would presume to speak. But, considering the trust which is reposed in my office with regard to this great national interest, I cannot in too strong terms express my official knowledge that it most urgently needs the attention of the Legislature. And I venture to hope and believe that your Lordships' full cognisance of the case will lead you to accord to that conclusion your authoritative sanction and furtherance.

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**From the Statement contributed in 1872 to the First Report of the Local Government Board.**

[It is necessary to explain that until August 14th the Medical Department was still under the Privy Council. The statement contains a Section relating to Public Vaccination, which has appeared in Vol. I., pp. 393-407, and a Section relating to Cholera.—Ed.]

**CHOLERA.**

A second exceptional business of the medical department in the year 1871 depended on there being again in the summer some alarm of Asiatic Cholera. Having for nearly two years been in Russia, and since August 1870

more or less in St. Petersburg, the disease in the spring and early summer of 1871 spread somewhat considerably in the Baltic provinces of Russia, and at the end of July began to touch the contiguous parts of Germany, where soon afterwards Königsberg suffered most severely. With cholera actually epidemic at St. Petersburg, Cronstadt and Riga, and likely soon to become epidemic at ports still nearer to England, it was evident that ships from the Baltic might in certain cases be a source of danger to this country.

As England has for many years accepted the view that in her case strict quarantine, centrally administered, cannot be made the means of excluding dangers of that sort, and as in consequence the defences which she can use against cholera on the continent of Europe are substantially only such as local authorities are respectively empowered to apply against the ordinary contagia of their own districts and neighbourhoods, so the steps which Government had to take in view of the fact of cholera in the Baltic were mainly these:—to warn local authorities (and especially port-authorities) of the danger in question; to advise them of the precautions which in the present state of knowledge are regarded as of most value against the infection of cholera; and to see that every legally possible facility was given for the local exercise of such precautions. On July 29th the Lords of the Council issued an Order, and on August 3rd and 5th other Orders, designed to facilitate the examination of ships arriving from the Baltic, and generally, in relation to such ships, the action of local authorities under the provisions of the Sanitary Act, 1866; while also, by their Lordship's direction, I issued for general public use a memorandum of precautionary suggestions concerning cholera: of which Orders and Memorandum copies are subjoined [A]. Further, since local authorities, into whose districts cases of sea-borne cholera might be imported, could take no useful action in the matter except in proportion as they had previously provided suitable hospital-accommodation for such cases, and since there was reason to fear that authorities were hitherto scarcely at all exercising the power given them for provision of hospitals, the chief port-authorities of England had to be



Cholera.

addressed on this subject, and in most instances the ports were visited by an inspector of the department, instructed to confer with the authorities. I subjoin (Appendix) a tabulated list of the 48 port-visitations which were made, chiefly by Mr. J. N. Radcliffe, for this purpose; with note in the list where the advice given included points special to the locality, and with abstract of the arrangements afterwards adopted by the several authorities.

At the time when these arrangements were first recommended, the danger was comparatively remote, in the sense that any sailor or passenger who had caught cholera in some Russian port of the Baltic would probably have ended the infectious stage of the disease in death or convalescence before the arrival of his ship in English waters; but afterwards, as more westerly ports in succession got infected, including (early in September) Hamburg and Altona, the chances were greatly increased, not only that ships might arrive having had cholera on board, and with bedding and other things in need of disinfection, but also that an occasional patient at the height of the disease, and pouring forth infective discharges, might be brought on shipboard into some English port; and it was therefore very satisfactory to know that, almost universally, fair provision for any such casualties had been made. The cases in which port-authorities actually had to treat particular ship-arrivals as infectious were, I believe, very few; almost universally they were cases where death from cholera had taken place during the transit; and I know only of a single case (namely at Hartlepool) where the authority had to receive into hospital a cholera patient brought living into the port.

Lest, however, this fact should seem to suggest that the local provision of hospitals was unnecessary, several other considerations have to be borne in mind: first, that any single cholera patient, landed without proper precautions, might have started an epidemic of cholera, capable of indefinite extension in and from the place of his arrival; secondly, that at the present date cholera is still prevailing in the Baltic ports of Russia, and may, some weeks hence, when the Baltic traffic re-opens, become of at least as much

concern to us as six months ago; thirdly, and not least, that irrespectively of cholera, and because merely of the frequency with which cases of common infectious fevers are brought by ships into English ports, each port was previously in need of ready hospital-accommodation for a few such cases, and the accommodation provided for cholera is, in the absence of cholera, available for those other diseases.

In connexion with the present mention of cholera, I think it necessary to point out that the disease, as now prevailing in Russia, probably represents circumstances of considerable new danger to the public health of Europe. Mr. J. N. Radcliffe, who of late years, with much epidemiological learning, has noted minutely for this department the various steps of cholera migration from Asia, draws my attention to the fact that recent developments of traffic to the south of the Caucasus have already brought Persia into such easy and frequent communication with the Euxine, as virtually to have established a new route for the migration of Asiatic cholera into Europe: by which route he thinks it highly probable that the present infection of Russia was effected; and in the same sense, but prospectively, Mr. Radcliffe refers with apprehension to the probable influence of the line of railway, now soon to be partly opened, from Baku on the Caspian to Poti on the Euxine. It is of course an obvious and serious consideration, that, in proportion as movement becomes quicker towards the great markets of Europe from the constantly infected pilgrimage resorts of Persia and India, there is withdrawn one of the protective conditions which have hitherto made cholera so exceptional in Europe.

I subjoin [A] a tabular description of the 55 local inquiries which the inspectors of the department made during the year in matters of general sanitary administration. Of these inspections, five related to questions of voluntary hospital-accommodation to be provided under section 37 of the Sanitary Act, 1866; but the remaining 50 related to defaults of the local sanitary authorities in matters of statutory obligation, and for the most part to outbreaks of epidemic disease which these defaults, existing often

Local inquiries  
into Sanitary  
Administra-  
tion.

Local inquiries  
into Sanitary  
Administra-  
tion.

to the most scandalous extent, had occasioned. In addition to the above there were 86 cases where local epidemics were brought under notice of the department, or complaint was made of local circumstances likely to produce disease, but where (though in many cases a medical inspector's visit would have been desirable) inquiry and advice could only be by correspondence.

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LOCAL GOVERNMENT BOARD REPORTS,  
1874-1876.

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