

Extracts from the annual report of the medical officer of the local government board for 1891-92. On manure nuisances.

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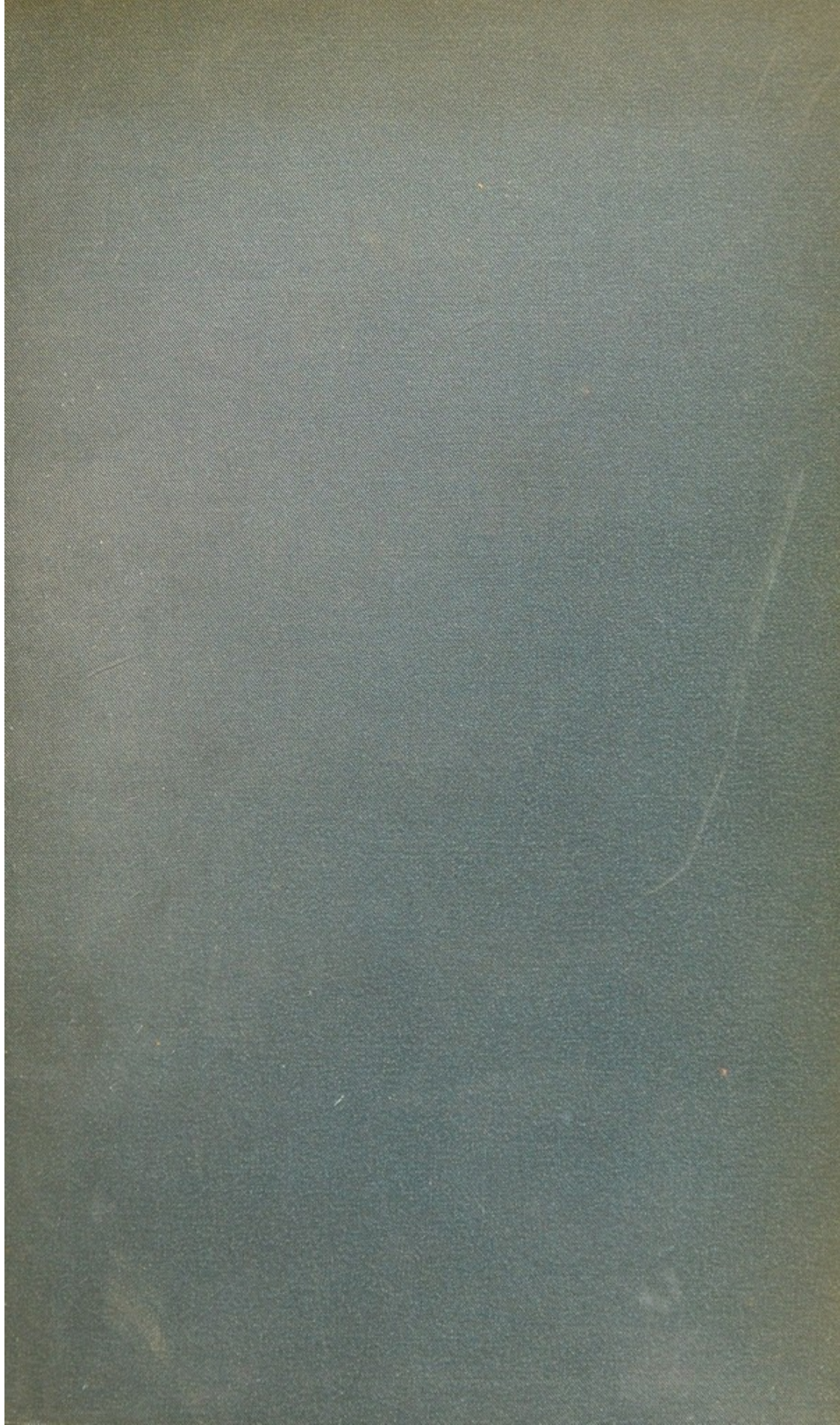
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E X T R A C T S

FROM THE

A N N U A L R E P O R T

OF THE

M E D I C A L O F F I C E R

OF THE

L O C A L G O V E R N M E N T B O A R D

For 1891-92.

O N M A N U R E N U I S A N C E S .

9127

EXTRACTS

FROM THE

ANNUAL REPORT

OF THE

MEDICAL OFFICER

IN THE

LOCAL GOVERNMENT BOARD

FOR 1897-98.

ON MANURE NUISANCES.

E X T R A C T

FROM THE ANNUAL REPORT OF THE

MEDICAL OFFICER

OF THE

LOCAL GOVERNMENT BOARD

For 1891-92.

Henry Franklin

DR. PARSONS'S REPORT ON MANURE NUISANCES.

Numerous complaints having reached the Board, from various quarters, as to nuisance and injury to health in connexion with the transport of town manure into agricultural districts, Dr. Parsons received instructions to inquire into the circumstances of this traffic, and he has submitted an exhaustive report on the subject (Appendix A., No. 9). Two principal objects were held in view during the inquiry. In the first place it was desired to learn how far allegations as to injury to health, and even as to the production of definite disease, as the result of exposure to the emanations of town manure, were supported by actual experience. And, in the second place, it was sought to ascertain how far nuisance owing to the unloading and temporary deposit of the manure at railway sidings and elsewhere, and owing to lack of care in the process of carting along public thoroughfares, could be dealt with by the aid of existing statutes and byelaws; or called for new regulations, under byelaws or otherwise, such as could be contrived without placing undue restriction either on Sanitary Authorities having a duty to dispose of such material, or on agriculture.

"London manure" occupied a prominent position in connexion with these complaints. It is, as a rule, entirely free from human excreta, but it is otherwise a compound of nearly every form of animal and of some forms of vegetable refuse; such materials as dead and putrefying animals, fishguts, paunches, &c., being mingled with stable manure, cabbage stalks, rotten vegetables, &c. And the diseases which were most commonly regarded as being referable to the offensive emanations were diphtheria and allied sore-throat.

The first point is dealt with at considerable length in the report, and the outcome of the inquiry may be held to show :— 1^o, that in so far as bodily discomfort and functional disturbance, at times involving general impairment of health, are concerned, exposure more or less recurring to the offensive effluvia concerned, does affect health ; and 2^o, that whilst certain affections such as “sore-throat,” which it has not always been possible to differentiate from diphtheria, can with some degree of certainty, be held to have relationship with exposure to the manure-effluvia in question, it has not been possible so to eliminate other sources of infection and of disease as to identify the effluvia with the production of any specific affection.

With regard to the second part, Dr. Parsons has a number of valuable suggestions to make, and utilising the information which he has obtained the Board have, in advance of the issue of his report, drawn up a new byelaw dealing with the unloading and deposit of filth emitting stench in proximity to buildings used for human habitation or to places of public resort.

* * * * *

R. THORNE THORNE.

May 1893.

REPORT.

REPORT

No. 9.

REPORT on an INQUIRY concerning the NUISANCES arising during the transport of MANURE from TOWNS to AGRICULTURAL DISTRICTS, and the means available for their prevention or mitigation; by DR. PARSONS.

THIS inquiry was ordered by the Board in view of the complaints—often strong and reiterated—frequently received by them of the grave nuisances, and sometimes of the alleged injury to health therefrom, arising during the carriage of town manure for use in agriculture.

These complaints have had reference chiefly to manure from London; though that from other large towns, as Liverpool, Newcastle, Nottingham, Portsmouth, and Plymouth, has also been complained of in the districts to which it goes. They have come especially from places on the shores of the Thames and Medway below London, and on inlets of the coast of Kent, Essex, and Suffolk, and also from inland places on the railways which traverse the fertile and highly cultivated tracts of land in the neighbourhood of London. These complaints seem to have been on the increase of late years, owing to the increased quantity of manure produced and used through the growth of London on the one hand, and through the substitution of the cultivation of fruit and vegetables* for corn-growing on the other; owing also to the longer distances which the manure has to be conveyed; to changes in the character of the population in the districts to which it goes; and to the increased attention now paid to matters affecting health.

The complaints have come loudest and oftenest from places of a suburban character situated in rural sanitary districts, and from small towns dependent upon the surrounding agricultural districts. In such places there is often a wide divergence of views and interests between the section of the inhabitants using them as a suburban residence, who wish for the amenities of town life, and the agricultural element which often predominates on local authorities, and objects to changes, especially such as involve increased rates and inconvenient restrictions. Hence we are apt to find, on the one side, a tendency to the use of exaggerated language in speaking of manure nuisances; on the other side, a neglect to observe, and a reluctance to enforce, such measures as people may reasonably be expected to take to prevent a traffic which is a source of profit to themselves becoming an annoyance to their neighbours.

It is obvious that the manure traffic as such cannot be stopped or seriously impeded, as it is a lawful trade, and is necessary in the interests both of the urban and the rural districts. The land must have the manure; the towns must get rid of it; and the interests and statutory powers of railway companies and other carriers have also to be taken into account. The matter is not therefore one in which heroic measures of prohibition can be recommended: the traffic must go on, but the aim must be to reduce its dangers and inconveniences to a minimum by securing attention to such measures of detail as shortening the time in which the manure is on the road, selecting suitable places for unloading, and preventing slovenly and offensive modes of cartage and deposit. How far existing

Occasion of inquiry.

Complaints of nuisance from manure traffic.

Especially in agricultural districts around London.

In places of a mixed agricultural and suburban character.

Manure traffic cannot be stopped.

* An acre of market garden may receive 40–50 tons of manure annually, equal to a layer of about $\frac{1}{2}$ inch average depth over the whole surface.

legal powers are adequate to secure these objects, and in what directions, if any, an extension of the law is from a sanitary point of view to be desired, will be considered in this report.

NOTES OF INSPECTIONS.

Extent of inquiry.

In order to gain information on these points I have visited many of the places around London from which complaints of nuisance from manure traffic have been received, and have been in correspondence with local health officers as to others. I have conferred with medical officers of health and other sanitary officials in the metropolis, and have received valuable information from them. I have visited under their guidance various places from which manure and refuse matters are sent, such as dust-yards, markets, slaughter-houses, and cattle ships. I have also conferred with officials in other Government departments on certain points arising in the course of the inquiry out of matters within their province.

My instructions were to confine my inspections in the first instance to places around London, and to apply for further instructions if I found it advisable to extend my inquiry to other places. This I have not thought it necessary to do, but some statements as to manure from other towns* will be found in the report. These are based partly on my own previous experience as medical inspector and medical officer of health, partly upon the reports of local medical officers of health.

Local investigations.

Places whither manure is conveyed by rail.

Swanley Junction.

The following are notes of my visits to places, whither London manure is carried by rail.

Swanley Junction, Kent.—This is a junction on the London, Chatham, and Dover Railway, about 17 miles from London, at the point where the branch line to Sevenoaks and Maidstone joins the main line. It is in the district of the Dartford Rural Sanitary Authority. A considerable number of houses have been erected in the immediate neighbourhood of the railway station, and much building is still going on there. The goods station yard has therefore come to be situated in the middle of a populous locality; the nearest house is within 30 feet of a siding on which manure trucks were standing at the time of each of my visits. The yard roadway is in bad repair, and in a filthy state, being covered with manure droppings, and saturated with foul matters.†

The manure traffic at Swanley Junction is not of recent date, but the bulk has very much increased of late years. The station-master informed me that the quantity of manure consigned to Swanley Junction (including May's siding) was about 40,000 tons a year (other informants placed the amount as high as 60,000 tons); he never received less than 20 trucks a day; the greatest tonnage being received in winter, between November and May. Trucks loaded with manure for other places may also have to stand for a time at Swanley Junction before being sent on to their destination. The bulk of the manure is unloaded

* Speaking generally the manure sent out of London differs from that from the large inland manufacturing towns of the Midlands and North of England in the following respects:—

1. It includes the specially offensive manure from Atlantic cattle ships.
2. The absence of human excrement.
3. The less proportion of coal ashes, owing to the higher price of fuel, and the demand for "breeze" by brickmakers.

The manure of such towns as Liverpool and Plymouth seems to resemble that of London in composition.

† During the fruit season a large traffic in fresh fruit takes place from this station.
 ▲ jam factory adjoins the goods station.

in the goods yard at Swanley Junction, and carted away thence. Some also is thrown on to the sides of the embankment of the Sevenoaks branch, for the use of the farmers whose land adjoins the line. At my visit I counted 50 manure trucks standing, or being unloaded, at Swanley Junction, besides a heap of stable manure, containing perhaps 100 tons, lying on the embankment within about 100 yards of houses, waiting for the farmer to take it away. May's siding, before mentioned, is on the Sevenoaks branch, about a mile from Swanley Junction, and in an open situation where the manure traffic would occasion much less nuisance than at Swanley Junction, being about 350 yards from the nearest house. It is, however, comparatively little used, as the company charge for manure sent there an extra 3*d.* per ton above the charge (2*s.* 1*d.* per ton), paid not only at Swanley Junction, but at other stations lower down the line as far as Sevenoaks.

The land about Swanley Junction is chiefly cultivated for vegetables and fruit. The manure brought thither consists chiefly of stable manure mixed with street sweepings and other refuse. Much of it comes from the manure depôt of the Newington Vestry. (See page 33.) Complaints have been made that it contains the putrid bodies of animals; but the station-master says that it seldom now contains offal or fish.

Numerous complaints have been received by the Board from residents at Swanley Junction concerning the nuisance occasioned by the manure traffic. It was referred to by Dr. Ashurst, then Medical Officer of Health for the Farningham division of the Dartford Rural District, in his annual reports for 1884 and subsequent years, as well as by the present Medical Officer of Health. Public meetings have been held and petitions signed to protest against the nuisance. On April 17th, 1886, a numerous signed petition of the inhabitants of Swanley Junction was sent to the Board, asking them to use their influence with the London, Chatham, and Dover Railway Company to induce them, with a view to abating the manure nuisance, to construct sidings at three points indicated by the petitioners, and stated by them to be convenient to the farmers and to be upwards of a quarter of a mile from dwellings, viz., at Spooner's Lane, at Swanley, and at Westead Lane; at the latter point, a siding ("May's siding," previously referred to) already existing, but requiring enlargement. In accordance with this request the Board communicated with the Railway Company. Their reply dated March 22nd, 1887, (which was only obtained with considerable difficulty, and after two interviews between one of the Board's staff and the secretary,) stated that as the company did not possess available land at any of the places indicated, the purchase of the necessary land, and the construction of the sidings would involve a large capital outlay, and the directors were unable to communicate their final views on the question. Appreciating, however, the importance of minimizing the inconvenience to the resident population of Swanley Junction, they had given stringent instructions at each of their sending stations that the utmost care was to be exercised in order that any highly offensive substances should be excluded from their premises. They had also urged the habitual receivers of the manure to take all measures within their power for the removal of the manure immediately upon its arrival at Swanley Junction. They pointed out, however, that, as common carriers, it was not within their power to refuse to accept at a public station, for conveyance to another public station, manure which was at the time free from noxious smell.

For some time after this,—whether in consequence of a diminution of the nuisance or because it was considered that all had been done which could be,—no further complaints were received respecting manure nuisances at Swanley Junction; but in July 1889, the Board received a com-

plaint from a resident near the Westead Lane (May's) siding, one of those proposed as alternatives to Swanley Junction, of the nuisance occasioned by the large accumulations of manure which were allowed to remain there for days together, as well as of the droppings of offensive matter upon the roads in carting. It was contended, however, by the Rural Sanitary Authority, that though there might always be a heap of manure there, owing to fresh manure being brought as fast as previous portions were removed, yet that each individual portion was removed within a reasonable time of its being brought. I learn that the heap of manure complained of was not actually on the Railway Company's premises, but in an adjoining field close to a lane.

More recently, however, the Board have again received complaints respecting the manure nuisance at Swanley Junction. In October 1891 a medical man wrote calling attention to the great amount of illness which, as he believed, was caused there by manure being placed so near dwelling-houses. The manure complained of, he stated, was not ordinary stable manure, but consisted largely of putrefying animal matter, dead cats and dogs, fish, &c. To this cause he attributed a large amount of diarrhœa, sore throats, and scarlet fever.

As regards the actual state of things at my visit on December 4th, 1891, there was, as I have said, a very large quantity of manure at the goods depôt, both in truck and lying on the embankment, and in spite of its being winter, a very strong offensive smell; although the inhabitants assured me that this was nothing to what it was at times. A similar state of things was again found by me at a visit on September 16th, 1892.

Statements of
residents.

I made personal inquiries at each house in the street nearest the goods depôt as to nuisance or injury to health attributed to the manure. This street, which is 115 yards long, contains 24 houses; No. 24, the nearest to the manure wharf, being less than 30 feet distant therefrom, and No. 1, the length of the street further off, or 125 yards distant. At every house complaints were made of the offensive smell of the manure, and at some there were complaints of its affecting health, these being mostly at the end nearest to the sidings. (At the same time there were other causes of danger to health; the street being unrepaired and in a foul state; it was not sewered; and there were defective drains and cesspools near the houses. Sewage nuisances abounded, owing to the circumstance that tap-water had been laid on, while no sewers had been provided to carry off the increased amount of waste liquid.)

The following are examples of the statements made to me by residents:—

- A.—The smell often makes her sick when she goes out; can never open her bedroom windows for it. Has never been well since she came here, four months ago. Suffers from congestion of liver, diarrhœa, and vomiting. Her little girl suffers similarly, and her boy occasionally. They were quite well before they came to Swanley Junction.
- B.—Complains of the smells, "dreadful smells, not like common dung." She has to shut her doors and windows. Has lived in the street five years. Has not had good health since she came. Is thin and ailing and has frequent diarrhœa, and a child has had congestion of the lungs. Her husband works among the manure, and it often upsets him. It did so when they lived in a neighbouring hamlet before they came here, but the rest of the family had then good health. The smells were not then so close to the house.

C.—“Nuisance from manure terrible at times; such a stench as you never smelled before; it seems to get right inside you.” A lady who came to his shop was made sick by it one day. Has had no illness during the two years he has lived here.

D.—“Smell sometimes something dreadful, makes you feel queer,” but has had no serious illness.

E.—“Awful bad smells; worst in hot weather; make them feel sick.” No illness.

F.—“Very bad smell; it made her ill once or twice when she first came here after living at the seaside. Gave her diarrhoea, sickness and pain, but she has got used to it now.”

At several houses it was stated that the smell was worst in the early morning, and at two that it was worst on Monday mornings. Swarms of flies in summer were also complained of.

I heard of cases of enteric fever which had occurred at Swanley Junction and were attributed to the manure nuisance; but in view of the other sanitary defects existing there, it is difficult to ascribe them to this cause with any degree of confidence.

Dr. Tucker, of Swanley Junction, tells me of a disease locally called “Dumb ague,” which is endemic in the neighbourhood, and which he believes to be connected with the manure effluvia. It is marked by cerebro-spinal symptoms with enlargement of spleen. It begins with shiverings, which are repeated daily. There are loss of appetite, flatulency, diarrhoea, prostration, pain over the heart and liver, as caused by a tight girdle, and a tender spot on the spine. The tongue is red and dry, and the patient is thirsty in the morning. There is numbness of the tips of the fingers, and a feeling of tightness over the brain; and loss of memory occurs. The temperature during a paroxysm may be 103° to 105° F. in the morning. These cases are not confined to Swanley Junction, though more frequent there than elsewhere; they are also met with on the hills. He is never without one under his care. People are not affected on first coming to the district, but only after two or three years’ residence.

He quoted the case of a woman living at a farm $1\frac{1}{2}$ miles from Swanley Junction on high ground with a subsoil of gravel over chalk, but where London manure was used, there being always a heap of some 20 to 40 tons within 20 yards of the house. The patient had resided there for 15 months when she was taken with symptoms of cerebro-spinal irritation and intermittent fever. On being sent away she quickly recovered and came back quite well; but after a lapse of five months the symptoms recurred. This happened several times, and after three years’ residence she left the place, and has since remained quite well.

Mr. Tucker told me also of people in Swanley Junction who suffered from similar symptoms when much offensive manure was being unloaded, but recovered when the unloading ceased, or in windy weather; the smells being always worst in still weather.

One would have expected, however, that if cases of this kind were really due to manure effluvia, they would have been observed elsewhere in connexion with manure nuisances, which, so far as I know, is not the case.*

* In a report on an outbreak of cerebro-spinal meningitis in 1891 at Hendon, Herts, Mr. Gruggen, Medical Officer of Health, states that the first patient was a hay carter, and was in the habit of going to London with hay, and returning with manure upon which he slept during the return journey. The next case, occurring six days later, was that of a man who at times accompanied him.

Feltham, Middlesex.—This place was visited by me on December 9th, 1891, in consequence of complaints made by a resident as to the nuisance arising from manure traffic at the railway station.

Feltham.

Feltham is about 10 miles west of London on the Windsor and Reading line of the London and South-Western Railway, and in a level fertile market gardening country. It is in the district of the Staines Rural Sanitary Authority, a body whose administration has recently been unfavourably reported on to the Board by Dr. Blaxall. Feltham is a place of a suburban character and increasing in size, but no urban powers or byelaws are in force there or anywhere in the district. I was informed by a member of the Authority that a proposal to apply for urban powers had been brought forward at a recent meeting, but rejected "on account of the enormous expense," and because it was thought that they were unnecessary.

Mr. Ashwell, of Bridge House, Feltham, states that the manure traffic was formerly small, but has largely increased of recent years. The manure trucks were formerly unloaded in the station yard, close to the passenger platforms; but owing to complaints from passengers, the company first limited the unloading of manure to certain hours, viz., before 8.30 a.m. and after 7.30 p.m., and afterwards, withdrawing this restriction, constructed a new siding for manure, which, while removing the nuisance further from the station, has brought it nearer to Mr. Ashwell's house. This house is close to the railway, and the new siding is on the other side of the main rails, about 50 or 60 yards distant from the house. The manure is said to contain soft core, dead bodies of animals, rotting meat and fish. Consignments of 2,000 tons are not unfrequent, three to five or more truck-loads coming at a time. Individual trucks do not remain long on the siding, but there is a constant succession. The manure comes at all seasons of the year, and is generally put at once upon the land. The nuisance from it is worst when the wind is from the N. or E., i.e., in the direction towards Mr. Ashwell's house. It is worse in damp muggy weather than in hot dry weather. Mr. Ashwell suffers from frequent sore throat, which he attributes to the smells from the manure. Dr. Morris, his medical attendant, also attributes the sore throats (follicular tonsillitis) from which Mr. Ashwell and his family have suffered to the manure effluvia. Dr. Morris stated that two years ago there was quite an epidemic of follicular tonsillitis in the lane leading from the railway station at a time when some very offensive manure was being carted. He says that the smell is sometimes horrible, making him ready to vomit his breakfast; it is not like stable manure, but like decaying animal matter. He stated that he occasionally met with cases of sore throat and diarrhoea among farmers and their men working among manure. Two farmers, however, with whom I conversed, including one of those referred to by Dr. Morris, did not believe that injury to health ever arose to themselves or their men from working among manure.

Dr. Willoughby, Medical Officer of Health, says that many people complain to him of the nuisance from the manure at the railway siding; but he has not heard so many of the carting of manure through the street. Similar complaints are also made of the manure traffic at Sunbury, Ashford, and other stations in the Staines Rural District.

At the time of my visit there was little manure at the Feltham siding, and that not specially offensive.

Sunbury.

At Sunbury Station the sidings are close to the platforms. I was informed that in view of the complaints of passengers no manure was carried thither during the summer months.

Paddock Wood and Marden, Kent.—The Board having from time to time received complaints of the nuisance arising from the unloading of fish manure at the Paddock Wood and Marden Stations of the South-Eastern Railway, I visited these places on May 23rd, 1892. They are situated in the heart of the Kentish hop district, and large quantities of manure are received there, especially fish manure, which is highly esteemed for promoting the growth of the hop plant. At the time of my visit, however, the bringing of fish manure had just been discontinued for the summer season, and all that I saw at Paddock Wood was some which had been spread on a hop field the week before, and which being dry, was not then so offensive. The manure consists of the refuse parts of fish, as heads and tails, bones, and guts, not of whole fish which have become spoiled. It is, however, on its arrival very offensive. Paddock Wood.

At Paddock Wood I was met by the rector and several other inhabitants, who complained most strongly of the nuisance; the smell is said to reach to distances of several hundred yards, and to hang about the roads long after a cart laden with the manure has passed. One gentleman complained of being affected in health by the smell, viz., with diarrhoea and loss of appetite. The sidings at which the manure is unloaded adjoin the passenger station, which is in the middle of the village, and there are about 20 houses within 100 yards of them.

At Marden the sidings are even more objectionably situated than at Paddock Wood, being alongside the approach to the passenger station, so that passengers have to pass close to the trucks in order to get to the station. They are also within a few yards of a dwelling-house and of the churchyard. About six or eight trucks of manure are received daily. At the time of my visit several trucks of stable manure were being unloaded, and one of offensive tanyard refuse, consisting of lime, hair, and fleshings; and the roadway to the station was littered with droppings. No fish manure had been received for several days, but the smell of decaying fish was still perceptible. Marden.

Mr. Butterfield, Medical Officer of Health for the Tonbridge and Maidstone Rural Sanitary Districts, in which Paddock Wood and Marden are respectively situated, who accompanied me on my visit, suggests that a siding at Collier Street, midway between Paddock Wood and Marden, would be as convenient to many of the farmers as either of the existing stations, and would be comparatively unobjectionable. He says, however, that the Maidstone Rural Sanitary Authority approached the South-Eastern Railway Company with respect to the nuisance at Marden Station, and were informed that sooner than incur any expense the company would give up carrying the manure, which of course would not suit the farmers.

I understand that the objection on the part of railway companies to provide sidings at intermediate points between stations is based, not merely upon the expenses of constructing the sidings, but also upon the necessity, on a main line, of having a signal-box, and a man in charge. There is, however, already a signal-box near Collier Street.

A branch line is also now being constructed from Paddock Wood to Cranbrook, and possibly a suitable situation might be found for a siding on this line; as I am told that the objections to a siding on a main line do not so much apply to one on a branch.

In 1891, in consequence of complaints from Paddock Wood as to the nuisance from the fish manure, the Board communicated with the directors of the South-Eastern Railway, who replied that they could not find that any nuisance had arisen, and that in view of the necessities of agriculture, and of their obligations under their Acts of Parliament,

they could not refuse to carry manure, but that as far as possible they carried only manure in a fit state.

The following are other places in the neighbourhood of London from which complaints of nuisance from manure traffic at railway stations have been received, about which I have obtained information, though I have not visited them in connexion with this inquiry.

Cookham.

Cookham (Berks).—An outbreak of diphtheria in 1889 in the neighbourhood of the station was locally attributed to manure effluvia. Dr. Woodforde writes me that the Great Western Railway Company have now extended their siding for the manure trucks so as to remove them further from the roads in which the greater part of the diphtheria outbreak of 1889 occurred. The manure is also now removed the day after its arrival.

Egham.

Egham (London and South-Western Railway).—Dr. Woodforde informs me that complaints are received of the unloading of manure at this place, though less frequently now than formerly; but from newspapers I learn that they have not entirely ceased.

Welwyn.

Welwyn (Herts).—The Rural Sanitary Authority complained in 1889 that truck-loads of foul London manure, containing slaughter-house offal, were allowed to remain, sometimes for days, at the station, causing nuisance to passengers and the families of railway servants. Cases of disease were said often to arise from handling the manure. Mr. Kite, clerk to the Authority, now informs me that upon a representation being made to the Great Northern Railway Company, an extension of siding room was made so that the trucks can be unloaded farther from the platform than was formerly the case, and that by this means, and by unloading them as quickly as possible after arrival, the nuisance has been abated.

Maidstone.

Maidstone (London, Chatham, and Dover Railway).—Mr. Adams, Medical Officer of Health, in his annual report for 1889, speaks strongly of the nuisance which had arisen from the arrival and unloading of London manure and the drawing of it by traction engines through the town. He informs me, however, that it has not recurred since October 1891, owing, as he believes, to the protests which he made having led to the manure being consigned to country stations instead of to Maidstone.

Bexley.

Bexley and Sidcup (South-Eastern Railway).—Complaints have been made from time to time during the past 10 years of nuisances from the manure and offal brought to these stations, which are in the district of the Bexley Local Board. The grounds of complaint are especially that the sidings are too near to the passenger stations, and that through careless carting the manure is allowed to drop on the roads. The Local Board took counsel's opinion, but were advised that so long as their byelaws were complied with, they had no ground of action against the railway company. The clerk informs me that the traffic still causes a very great nuisance at both stations.

Nuisances from
manure brought
by rail from
towns other than
London.
At Saltash from
Plymouth
manure.

The following are instances, among others, in which the bringing by rail of manure from towns other than London has formed subject of complaint:—

Saltash, Cornwall.—Mr. Kerswell, Medical Officer of Health for the St. German's Rural District, complained, in 1883 and 1884, that large quantities of town manure, containing decomposing vegetable matter, putrid blood, rotten meat and fish, were brought by rail from Plymouth to the Saltash Station, and were allowed to accumulate in the station yard, whence the manure was drawn through the town in uncovered carts, to the detriment of the health of the inhabitants. He advised that the nuisance should be stopped by causing the manure to be deposited at a

siding away from the town, or conveyed by water to quays distant from any habitation; that it should be conveyed in covered carts to prevent dropping, and that the carts and quays should be kept disinfected, as the smell remains some time after the heaps are removed.

Later, after the formation of a local board, it was reported that the nuisance from the carting of manure through the streets had been finally stopped, but it was not said how.

Hexham Rural District.—In his annual report for 1887 Dr. MacLagan, then Medical Officer of Health, complained strongly of the nuisances occasioned by the importation into the district of Newcastle town manure, to which he attributed outbreaks of diphtheria and enteric fever. In one instance a young man, who had been engaged in unloading this manure, and a railway clerk working in an office close to where it was unloaded, were taken ill on the same day with enteric fever. The manure was said to have contained a large quantity of decomposing vegetable matter and slaughter-house refuse, but probably night-soil would be a main ingredient.

In Hexham Rural District, from Newcastle manure.

Southwell Rural District.—The Medical Officer of Health complained in 1889 of the nuisance arising from Nottingham night-soil, sent to Lowdham, Southwell, and Farnsfield Stations (Midland Railway). He complained of its wet and offensive condition, and of its being sent in such quantities that farmers could not remove it in any reasonable time, and hence it remained at the stations for weeks. Fatal cases of diphtheria had been regarded as connected with the nuisance.

In Southwell Rural District, from Nottingham manure.

Cumberworth, Yorkshire.—Dr. Barry, in a recent report on this district, corroborates the complaint of the local Medical Officer of Health as to a manure nuisance at Denby Dale Station. He says, "Denby Dale Station is situated on a hill-side directly above the most thickly inhabited part of the district, and waggons containing Huddersfield manure stand for considerable periods of time in the sidings there until the farmers fetch it away. I understand that the land to which it is chiefly taken lies on the opposite side of the valley, and the local people suggest that the Lancashire and Yorkshire Railway Company might easily arrange to have sidings there, where the manure would give rise to no nuisance."

In Cumberworth urban District, from Huddersfield manure.

The following places, in which nuisance from water-borne manure has formed subject of complaint, were visited by me during this inquiry:—

Greenhithe.—This place is on the Kentish shore of the Thames, in the district of the Dartford Rural Sanitary Authority. The village street is closely parallel to the river, a row of houses intervening; from this a road runs southward, passing the railway station, and crossing the London and Gravesend high road, into an agricultural neighbourhood. Near the London Road are many villa residences.

Nuisances from manure conveyed by water. Places visited in course of this inquiry. Greenhithe.

Numerous complaints have been made to the Board, as far back at least as 1883, of the nuisances arising from the London manure brought by river to Greenhithe and carted thence into the country. These complaints have reference to—

1. The character of the manure brought.
2. The place at which it is discharged.
3. The mode of carting it along the roads.
4. The places of deposit for application to the land.

1. The manure brought by barge is said not to be simply horse and cow dung, but to contain refuse of various kinds, dead animals, bad meat and fish, &c., and to be extremely offensive, especially when the barges have been detained and the manure is in a heated condition.

2. The place of unloading is a public "hard" or landing-place, the use of which is free. It is close to the village street, and is approached by a

passage only 9 feet wide, between two high buildings, viz., a chapel on the one side and an hotel on the other. The barges are floated at high water up to this passage, and the manure is unloaded into carts standing there, under the windows of the above-mentioned buildings. Any air blowing through the passage carries the smell to the houses on the opposite side of the street.

3. The carts are not only open, thus permitting the escape of effluvia, but are said to be so carelessly loaded that the piled-up manure drops off into the roads, where it is ground up by the traffic into foetid mud ; so that the smell of manure prevails even when the carts have gone by.

I saw at the "hard" a notice as follows :—

" DARTFORD RURAL SANITARY AUTHORITY.

" Notice.

" All persons carting manure or other like material from this landing-place are particularly requested to prevent the same from spilling, and thus causing a nuisance to the inhabitants.

" (Signed) J. C. HAYWARD,
" Clerk."

I was informed that after the issue of this notice more care was for a time taken by carters to avoid the spilling about of manure, and to sweep up any that may have been spilled.

4. Complaints are made that the manure is deposited on land too near to dwellings. At a visit paid by me on June 13th, 1892, I saw two heaps of manure lying near the road opposite the row of villas called Cobham Terrace. One of these heaps was a very large one, and consisted of stable manure mixed with house refuse and portions of dead animals. It was within 100 yards of five houses, of which the nearest was only 30 yards distant, and it had been lying there, as I was informed, from the previous Wednesday to the Monday when I saw it. The stench from it was much complained of.

As regards injury to health, Dr. Richmond, Medical Officer of Health, in answer to my inquiries stated that he had recently attended in her confinement the wife of the proprietor of the hotel next the landing-place. This took place in the early morning ; a barge-load of manure was being unloaded at the time, and the smell was very offensive. The patient suffered for a week after her confinement from symptoms of blood poisoning, which Dr. Richmond believed to have been due to the effluvia from the manure, but she eventually recovered. He could not quote any other case of serious illness clearly attributable to the manure effluvia, though he says that many people are made to vomit by them. A fatal case of choleraic diarrhœa occurred a few years ago in a house opposite the landing-place, but though the child's illness was attributed by the father to the manure effluvia, Dr. Richmond thinks it quite as likely to have been due to the defective drainage of the house. Diphtheria is endemic in the neighbourhood, but it is difficult to attribute it to the manure nuisances on account of the bad sanitary condition of many of the houses. In a former report, however, (Annual Report for 1885,) he says, referring to the manure nuisance, "the abatement of this nuisance is of more importance than all the other sanitary work of the district."

The measures required to prevent the nuisance at Greenhithe seem to be to provide another landing-place ; to require the use of covered carts ; and to prevent dropping of manure on the roads.

The latter objects might be secured by byelaws under section 44 of the Public Health Act, 1875, or under section 26 of the Public Health Acts Amendment Act, 1890, but the Rural Sanitary Authority have

not put themselves in a position to make such byelaws, having declined to apply for urban powers under either Act. The reason assigned, besides unwillingness to interfere with agricultural interests, is that Greenhithe is a portion only of the parish of Swanscomb, and that the Authority have no evidence that urban powers are needed or desired in the major portion of that parish.

Dr. Collingridge, Medical Officer of Health to the Port of London Sanitary Authority (whose jurisdiction at Greenhithe extends to high-water mark), informs me that he caused application to be made to the Dartford justices for an order against a bargeman to discontinue unloading manure at Greenhithe, as creating a nuisance under the Public Health Act; but the order was refused on the somewhat singular ground that the Inspector of Nuisances, who made the application, was not a person aggrieved.

Dartford, Kent.—The manure coming here is brought in barges up a creek from the Thames to several private wharves on the edge of the town. It has been the source of complaint at various times. Dartford.

The manager of the London Paper Mills Company told me that the nuisance from unloading manure at the adjoining wharf (Waller's wharf) was sometimes very great, so that women in the factory, which is about 80 yards from the wharf, had sometimes to leave off their work. The late manager, too, could not one day stop at his work owing to the smell making him ill; his office was 30 yards from the wharf.

An entry in the journal of the Medical Officer of Health refers to this as follows: "On August 5th, 1891, at the request of Mr. Reid (manager of the paper mills), I again visited Mr. Waller's wharf, where manure was being unloaded. The day was hot, the stench was bad, and Mr. Reid informed me that it was so strong in his counting-house that it caused him an attack of diarrhœa. In these circumstances it is certainly prejudicial to his health."

Complaints have also been received from another factory in the neighbourhood of this smell from the manure at Waller's wharf.

At my visit on December 10th, 1891, I saw at Waller's wharf several heaps of manure, some hot and steaming, and others old and grown over with weeds; one heap might contain perhaps 150 tons. I was informed that some of it was the same as that complained of on August 5th, and had been lying there ever since. The manure consisted chiefly of horse dung, but contained also fish and beef bones, cabbage stalks, rotten turnips, old bottles, old bonnets, sardine tins, a dead dog, &c.

Beadle's wharf, on another branch of the creek, has a number of dwelling-houses close upon it. Here I saw lying several hundreds of tons (16 freights of about 40 tons each) of manure in various stages of decay, some still heating, other portions quite rotten. Some of the cargoes consisted of cattle-ship dung; others contained rags, spent hops, and bullocks' paunches, hair and other refuse from slaughter-houses. The manure is the property of dealers; it comes in the summer, and is stored here, being used on the land principally in the winter.

At Victoria wharf, which is on the opposite side of the same creek as Beadle's wharf, I saw other heaps of manure, some of which were being carted away. Some were of cattle-ship manure, others contained domestic refuse, as old boots and hats, mats, floorcloth, paper, and tins. One heap contained many soiled bandages and other rags, seemingly from a hospital.

The cattle-ship manure is most complained of, as it is strongly heated on arrival. It contains much wasted maize, affording food to rats, which swarm about the wharves. It has a peculiar pungent sour smell, probably due to the fermentation of this maize.

The manure is most offensive when freshly unloaded from the barge, as it is then actively heating: it becomes less offensive after being stacked for a fortnight..

The carting of the manure through the town is also offensive, but the unloading of the barges is most complained of.

The Dartford Local Board have byelaws under section 44, Public Health Act, 1875, following the Local Government Board's Model Series II. These, if enforced, would prevent the storage of manure, unless deodorized (*e.g.*, by covering with earth) within 100 yards of a dwelling or workplace; and would require carts to be covered, and any droppings to be swept up. The Local Board, however, as I am told, do not enforce their byelaws in these respects, for fear of being thought to harass the agricultural interest.

rays.

Grays, Essex.—Manure is brought to two private wharves on the opposite sides of a small creek leading out of the Thames. The nearest end of these wharves is about 70 yards, and the farthest 140 yards from a continuous row of houses in a street at right angles to them. There are also workshops close to each wharf.

At my visit on June 13th I found lying on one of these wharves three loads, about 180 tons of manure, which came almost up to the windows of one of the workshops. It consisted partly of cattle-ship dung, partly of stable dung mixed with fish refuse. The cattle-ship dung, which was mixed with a little lime, was not very offensive at the time of my visit, which was made on a cool breezy day, but the fish offal, which had been lying for nearly a week, was much complained of by the workmen in the adjacent workshop.

Queenborough.

Queenborough is situated on the Swale, the channel which divides the Isle of Sheppey from the mainland of Kent. Though possessing an ancient municipality, it is in point of size a village consisting of a single street, parallel with the Swale.

The manure brought here contains offal and market sweepings, and comes mostly in the spring of the year, when the farmers are not otherwise busy. It is landed at a public "hard" or wharf, the property of the Corporation, who make a charge of 8s. per load, or 1*l.* per barge per year. This wharf is immediately at the back of the main street, about 35 yards from a row of houses. The manure is not thrown upon the wharf, but direct into the carts. Nuisance arises, first and chiefly, during the unloading of the barges, owing to the nearness of the wharf to houses; second, from effluvia given off during the passage of carts along the street; third, from dropping of manure in the streets; fourth, from the pumping out of foul bilge water.

The byelaws (based on the Local Government Board's Model Series II.) in force in the district require carts conveying filth to be covered. A good tarpaulin tied at the corners is found effectual to prevent nuisance during the passage of carts; but some of the tarpaulins used are not so good as they might be, and hence manure rolls off the carts, and the surveyor has often to send men to sweep it up. It is really the duty of the person conveying the manure to do this; but the Surveyor does not like, he says, to be always summoning his neighbours. The principal importer of manure is a member of the Corporation, and has been mayor.

Mr. Swales, Medical Officer of Health, has no evidence that the manure effluvia have occasioned injury to health, though he admits that they are a nuisance. The Surveyor, who lives in one of the houses by the wharf, says that he often can use only the rooms on the farther side of his house, and at times cannot eat his dinner for the smell.

The best remedy would be to provide a wharf farther away from the town (as the Corporation claim the whole water of the creek), but proper covering of the carts would do something to mitigate the nuisance.

Milton-next-Sittingbourne.—Much London manure is landed here by barge at a private wharf on Milton Creek, an inlet of the Swale. At my visit, on December 11th, 1891, there was a heap of about 12 tons of manure within 40 yards of a cooperage and a dwelling-house; this heap was then being carted away. Another larger heap, consisting of 19 barge-loads of 70 to 80 tons each, and containing, therefore, say 1,400 tons—chiefly of cattle-ship manure—was partly within 100 yards of a house. Some of this had been lying there for weeks, as shown by the growth of vegetation upon it.

Yet, at the wharf, a notice-board is put up, reading as follows:—

“NOTICE.—The byelaws in force within the urban district of Milton require that manure deposited within 100 yards from any street, building, or premises in or on which any person may be employed in any manufacture, trade or business shall be removed within 48 hours. Neglect of the byelaws subjects the offender to a penalty of 5*l.* and a further penalty of 48*s.* for each day after written notice of the officer of the Sanitary Authority.”

The proprietor of the cooperage, who lives at the adjoining house, says that in 1890, when an offensive cargo containing dead animals was unloaded opposite his house and workshop, about 30 yards from them, he and his wife and several of the coopers working for him suffered in health, having headache, sickness, and diarrhoea. His wife says that she began to be ill the same day that the manure began to be unloaded, and was ill a fortnight. Their house is old and in bad sanitary condition.

The Board received, on August 7th, 1890, a communication from Mr. Redgrave, Her Majesty's Inspector of Factories, drawing the Board's attention to the nuisance caused by the accumulation of barge-loads of manure on the wharves at Milton, which he considered to be offensive and injurious to the persons employed in the adjacent factories and workshops. He gave a list of eight such establishments, lying within range, according to the wind, of the nuisance at the wharves. He stated that, at his recent visit, at least 500 tons of manure had been lying there for some days, and that the stench was almost unendurable, so that, used as he was to the odours of manufacturing processes, it almost made him sick.

The Local Board have byelaws under section 44 of the Public Health Act, 1875, made in 1878 on the Local Government Board's model, but as it appears from their reported proceedings, they hesitate to enforce them, lest they should “drive trade away from the place.”

Dr. Fisher, Medical Officer of Health, informs me that since my visit a stricter observation has been kept on the manure deposited at the wharf, and it has not been allowed to accumulate to the same extent, especially on the part of the wharf closely adjoining the cooperage.

Much manure is also unloaded at a wharf on the opposite side of the creek, which is in the Sittingbourne Urban district. The Medical Officer of Health for Sittingbourne, Dr. Sutton, states in his annual report for 1889, that he has often traced enteric fever to London manure brought down for agricultural purposes in barges. He finds that the men who pilot these barges are often themselves sufferers, though their homes and surroundings are in good order.

Faversham, Kent, is also on a creek leading to the Swale. Dr. Boswell, Medical Officer of Health, informs me by letter that “a very considerable amount of London manure, some of which is very offensive, is landed at the town wharf (no part of which is more than

" 100 yards distant from houses) and carted through the town. The major part of the manure business, however, is carried on at Oare Creek, a part of the Faversham port, about a mile from the town itself. We have some local restrictions on this business which also apply to the business which is done in various forms of fish manure which are also carted through the town.

" 1st. All such carriage of manure must take place before 8 a.m."

[In the present byelaws this rule has been dropped, but Dr. Boswell tells me that as a matter of fact the farmers adhere to the old practice. He says that no difficulty has been found in removing 60 tons or so of manure in two mornings before 8.]

" 2nd. Where the manure is of an offensive character it is to be covered with tarpaulins.

" 3rd. All such manure must be removed from the quay within 48 hours of its debarkation.

" 4th. Any droppings in the street from the carts carrying such manures are to be cleared up *at once* by the men attending the carts.

" I have been inclined," he says, " to attribute several cases of diarrhoea—but after all only a very few—to the carriage of this manure, but I am sure that since the introduction of rules for covering the manure waggons, the nuisance has been much diminished. Formerly one could smell the trail of the vanished cart for hours after its passage."

" The men who work in the manure do not seem to suffer in health at all. The dwellings situated around the quay where the manure is landed, are occupied by the very lowest of our social strata, and among them illness of all sorts is more prevalent than among their more cleanly neighbours. Infantile diarrhoea is perhaps more common than is desirable, but there were only two deaths from diarrhoea—one infantile—in the whole town during 1891. Sore throat and diphtheria are not more common in the neighbourhood of the quay than elsewhere; diphtheria certainly is more prevalent in quite another district of the town.

" On the whole," Dr. Boswell says, " I should say that under restrictions the nuisance of this trade may be considerably reduced, but this is chiefly an agricultural district, and it has been a matter of some trouble to get an assembly popularly elected to interfere at all. It is perhaps possible that we are more able than other authorities to exercise pressure, as there is an alternative, but more inconvenient, quay at Oare, and the question of London manure is so constantly discussed that consignees, feeling their tenure precarious, are very manageable and conciliatory.

" With reference to byelaws, I am doubtful whether they do not tend to restrict rather than to enlarge the powers of the sanitary authority. The labelling of any unsatisfactory thing or condition of things as a nuisance and injurious to health seems to me practically to erect the sanitary authority into an absolute autocracy. Of late years I have never met with any tendency to question the right of the authority to do what seemed best in their eyes, merely because it was necessary and apart from all reference to byelaws."

Ormskirk
Rural District.

Ormskirk Rural District.—The following is from a report made by me in 1884, on the sanitary condition of the Ormskirk Rural District, Lancashire:—

" The soil, which is very fertile, is mostly cultivated in small holdings as market gardens; the great towns of Lancashire, to which

the district lies conveniently near, affording good markets for the produce, as well as furnishing the large supplies of manure which this kind of cultivation requires. Immense quantities of manure are brought by the Leeds and Liverpool Canal, which traverses the district in a circuitous course. These are a frequent source of nuisance in the villages by the canal, especially Maghull and Burscough Bridge. Besides stable dung, night soil, and house refuse, some of the manure contains fish refuse, slaughter-house garbage, and sweepings of markets, and much of it is very offensive. To some extent the nuisance is unavoidable, but it is increased—

“1st. By the manure being piled up in large heaps.

“2nd. By its being allowed to remain often several days before being removed.

“3rd. By the proximity of the wharves to houses and public places.

“When allowed to remain piled up in heaps the manure, especially if containing much vegetable matter, undergoes a kind of fermentation or putrefaction attended by heating, which greatly increases its offensiveness. The putting in force throughout the parts of the district near the canal of the byelaws for the prevention of nuisances might do something to mitigate the evil, either directly by enforcing speedy removal, or indirectly by leading to the provision of wharves in more suitable situations. Still in some instances grave nuisance has been complained of as being caused by the effluvia from these huge heaps of manure at a distance considerably greater than the 50 yards to which the operation of the byelaws before mentioned is limited, and some further provision or greater stringency of byelaw under section 44 of the Public Health Act, 1875, appears to be required in the district.”

Nuisances from water-borne manure in the Samford and Maldon rural districts will be mentioned in other parts of this report. (See pp. 19 and 20.)

THE EFFECT UPON HEALTH OF MANURE NUISANCES.

The question whether, and if so to what extent, nuisances arising from the carriage of manure and town refuse free from human excrement* are injurious to health, is beset with difficulties like those attending similar questions with respect to other offensive businesses. On the one hand, we get from persons not connected with these businesses loud complaints of offence to the senses, and somewhat vague assertions of bodily discomfort and impairment of health; on the other hand, from people engaged in them and brought into close contact with

Are manure nuisances injurious to health?
Difficulties of question.

* Of the danger of town refuse which, like that of many of the Northern and Midland towns, contains human excrement there can be no question. The evidence is very strong that the specific infections of enteric fever and cholera find their opportunities of transmission among human beings mainly through the contamination by human filth of air, soil, and drinking water. Such contaminations are most potent for evil when taking place in and around dwelling-houses, the inhabitants of which are exposed to their evil influences for a large part of each 24 hours. But there is no reason to doubt that harm may be sustained by susceptible individuals by such briefer and occasional contact with contaminated air as they may be exposed to in the careless removal of excremental matters for use as manure.

One danger in the use of night soil as manure needs to be especially mentioned, viz., the contamination of water supplies where these are derived from the surface water off manured or cultivated ground. An outbreak of enteric fever ascribed to this cause was reported on in 1884 by the Medical Officer of Health for the Cowpen Urban District, Northumberland, and one in 1891 by the Medical Officer of Health for the Whitworth Urban District in Lancashire. Another outbreak of enteric fever seemingly due to this cause occurred in 1892 at Ashton-in-Makerfield, Lancashire.

the offensive materials, we often meet with stout denials that they ever experience any injury to health therefrom. It must be remembered, however, that those who work in manure are strong healthy men leading an active open-air life, that they are inured to the work by custom and reconciled to it by considerations of gain. Their escape from illness therefore does not prove the innocuousness of manure effluvia to persons of less powers of resistance. As a matter of fact, however, I do not believe that men working among manure invariably escape injury to health. I have formerly recorded* several instances in my own experience in which men who had been engaged in unloading cargoes of manure had contracted enteric fever, and have heard of similar cases in that of others (*see pp. 6, 15, and 21 of this report*).

Another difficulty in answering this question is, that several of the districts in which complaints of manure nuisances have been most rife are, from a sanitary point of view, ill-administered in other respects, so that it is difficult to eliminate the operation of other causes of disease.

What is "injurious to health"?

Dr. Ballard in his report on effluvium nuisances† has well pointed out that more than one definition of the term "injurious to health," and more than one criterion of such an influence being exerted, may be suggested:—

"(a.) It may mean that exposure to the offensive effluvia causes bodily discomfort or other functional disturbance, continuing or recurring as the exposure continues or recurs, and tending by continuance or repetition to constitute (though perhaps not a clearly defined form of disease) an appreciable impairment of general health and strength.

"(b.) Or it may mean that persons exposed to them are more deeply and more definitely damaged in health; that their lives are shortened or pursued in chronic ailment; that they are rendered more liable than other persons to the invasion of definite forms of disease; or that diseases are with them apt to run a less favourable course than with other persons."

Must be answered affirmatively.

It is, I think, clear that manure nuisances may be injurious to health in the first of these senses, and there is, I believe, some evidence to show that they may occasion graver injury in the second sense.

Diminution of comfort apart from definite injury to health is a ground for legal redress.

It would seem that according to legal decisions a person aggrieved by a nuisance arising from an offensive trade is recognised by the law as entitled to relief if injury to the extent of diminution of comfort be proved. *See the case of Malton Local Board v. Malton Farmers' Manure and Trading Company*, quoted in Dr. Ballard's Report, Part III. (Annual Report of Medical Officer of Local Government Board, 1878, pp. 316, 317). *See also the case of Attorney-General v. Hussey* reported in "Public Health" of August 1890. In the latter case an injunction was granted to restrain the defendant from burning bricks so as to cause a nuisance; and it was held, quoting the words of a former judge, that a nuisance does not necessarily mean that which is injurious to health, but that it must be "more than fanciful; more than one of "mere delicacy or fastidiousness; an inconvenience materially "interfering with the ordinary comfort, physically, of human "existence, not merely according to elegant or dainty modes and "habits of living, but according to plain and sober and simple "notions among the English people."

* "Sanitary Record," May 17, 1878, page 314.

† Annual Report of Medical Officer of Local Government Board 1876, Appendix, page 117.

The effluvia from decomposing organic matters, such as those of which manure is composed, may produce evil effects upon the human body in more than one way. Thus they may do so by obnoxious impressions upon the senses, especially that of smell, and through the senses upon the nervous system; or they may do so by the introduction into the body through the medium of the air of actually poisonous chemical matters or injurious micro-organisms.

Modes in which injury to health may be produced.

In manure nuisances it is chiefly the stench, *i.e.*, the disagreeable impression upon the sense of smell, that is complained of. The mere offensiveness of a smell is not necessarily an indication of so serious danger to health as popular opinion would seem sometimes to suppose it to be. Certain odours sufficiently disagreeable, *e.g.*, those of a he-goat, or of burning soot, leather, or india-rubber, are not likely to be productive of serious disease. As a French proverb says: "Tout ce que pue ne tue pas." Yet even such odours may, to persons in delicate health or of acute sensibility, occasion a considerable amount of discomfort, and by impairing appetite and otherwise, might, if persistent, produce deterioration of health. Still more is this likely to be the case with smells which, like those of putrefying animal matter, are not only disagreeable but disgusting to most persons of ordinary constitution. As the odour of carrion is attractive to the blowfly of which it is the natural food, so, on the other hand, the repulsiveness of this odour to human beings may be looked upon as a natural warning to them of the deleteriousness of the chemical products of decomposition of animal matter.

Dr. Ballard remarks (*loc. cit.*, p. 118) how often one particular group of symptoms is mentioned as resulting from exposure to offensive trade effluvia. This group consists of loss of appetite, nausea, sometimes actual vomiting, sometimes diarrhoea, headache, giddiness, faintness, and a general sense of depression and malaise. And he considers that as these symptoms may result from different kinds of effluvia, having nothing in common except their offensiveness, it is difficult to avoid the inference that the symptoms have their origin in the impression made on the senses.

The symptoms which in the course of my inquiries I have heard most frequently mentioned by persons who complained of being affected by manure effluvia are vomiting (frequently produced by sudden exposure to specially offensive effluvia), nausea, diarrhoea, sore throat (described by a medical man as "follicular tonsillitis"), loss of appetite, headache, and general feeling of weakness and illness. Some of these symptoms may be due to impression on the nervous system through the sense of smell; but others, as the diarrhoea and sore throat, would seem more likely to be due to the more direct action of deleterious matters, chemical or organised, taken into the body.

Incidental discomforts, occasioned by manure nuisances, are swarms of flies in hot weather, and of rats, and the necessity of keeping windows closed to prevent foul smells from coming into the house.

Of graver and more definite forms of disease attributed to, or suspected to be produced by, exposure to manure effluvia the chief is diphtheria. A number of instances have been reported by skilled observers in which outbreaks of diphtheria in rural places, especially in the eastern counties, have been found to have been immediately preceded by the arrival of peculiarly offensive cargoes of London manure, to the effluvia from which the patients had been exposed.

Diphtheria associated with manure effluvia:

Mr. Elliston, Medical Officer of Health for the Samford Rural District, Suffolk, reports an outbreak of diphtheria at Chelmondiston in that district in June 1889, following the landing of an extra putrid

in Samford Rural District, Suffolk;

cargo of London manure, to the effluvia of which, as it was carted through the village, the first three patients were exposed. He also reports an outbreak of scarlet fever in July 1889, at Stutton, of which the first cases occurred in two families in contact with a heap of London manure. Dr. Airy, in reporting to the Local Government Board on the outbreak of diphtheria at Chelmondiston, says that it is difficult to deny a certain weight to the considerations on which the earlier cases were ascribed by local belief to the malodorous traffic in London manure, especially as diphtheria has of recent years become increasingly prevalent in London. In view, however, of the existence, which he ascertained, of certain earlier cases of the disease in Chelmondiston, and of the difficulty of recognising diphtheria in its minor phases, he records the suggestion that the foul effluvia of the London manure may have operated to hasten forward the development of some home-growth of the disease, rather than to introduce it in its already full-grown form from the metropolis. Again, in October 1890, two or three cases of sore throat followed by a bad case of diphtheria occurred at Chelmondiston. Some large heaps of London manure had been allowed to remain uncovered on a field in the middle of the village.

in Chelmsford
and Maldon
Rural Districts,
Essex ;

Dr. J. C. Thresh, Medical Officer of Health for the Chelmsford and Maldon Rural Districts, has recorded in his annual reports, and in a paper read by him before the Society of Medical Officers of Health, and published in "Public Health," April 1891, a number of similar instances in which outbreaks of diphtheria or epidemic sore throat have occurred in association with the importation of London manure; the first cases being in persons in close relation therewith. He mentions, however, other instances in which outbreaks popularly attributed to London manure, were found on comparison of dates to have preceded its introduction, and he thinks that the connexion falls short of absolute proof.

Dr. Thresh has recently reported ("Practitioner," September 1892) another instance in which a sudden outbreak of diphtheria at Bradwell was at first ascribed to London manure, but the dates, when correctly ascertained, negatived this view. The cases of diphtheria had all occurred along the course of one road along which about four days before the outbreak offensive manure had been carted, or else in houses from which the children on their way to school would have to pass the place where the manure was deposited. It was subsequently found, however, that the manure in question consisted of "five-fingers" (star fish) dredged in the neighbourhood, and that the cargo of London manure which had arrived on the same day, and to which the outbreak was at first ascribed, had been sent away again to another place to be unloaded.

in West Kent
combined
districts ;

Mr. Butterfield, Medical Officer of Health for the West Kent combined sanitary districts, has mentioned in his annual reports several instances in which outbreaks of diphtheria have been preceded by exposure to the effluvia of manure. I give one from his annual report for 1891, Maidstone Rural District :—

"Five members of a family residing in a cottage near Barming Bridge were taken ill with diphtheria at the time of the flood in October. No special unsanitary conditions were found on the premises. The mother attributed the illness to the stench from a barge which had been unloading London manure on the opposite bank of the river, which she described as being so bad as to compel her to keep her doors and windows shut. There had been no other case of diphtheria or sore throat in the neighbourhood and so far as I could ascertain, no possibility of infection."

In June a mild case in Nettlestead was attributed to the effluvia from London manure.

Mr. Butterfield says, by letter, "I have often associated cases of diphtheria with manure nuisances, but it would be difficult to exclude other possible causes. I am inclined to believe that the effect of the manure in promoting the evolution of diphtheria is confined to houses in the neighbourhood of large accumulations, or in streets and lanes through which manure is frequently carted. I do not believe that by itself manure causes illness, but I have from time to time found outbreaks of diphtheria in the neighbourhood of accumulations of manure (stable and farmyard, as well as imported), and have formed the opinion that it helps along with other factors—season, dampness of dwelling, and the presence of the germ—to promote the spread and intensify the malignancy of diphtheria."

An outbreak of diphtheria at Halling in the Strood Rural Sanitary District, Kent, in April 1887 was attributed by the Medical Officer of Health in part to the effluvia from a putrid heap of London manure containing slaughter-house refuse which had been spread on the land, and had caused a very offensive smell to pervade the neighbourhood. in Strood Rural districts;

In his annual report for 1889, for the East Ashford Rural District, Dr. Robinson mentions a solitary case of diphtheria which occurred in an out-of-the-way house at Challock. The sufferer was a young man who three days previous to his attack had been occupied in the removal of manure from a London barge, the smell of which was most offensive and penetrating.

The association of diphtheria with nuisances from town manure has been noticed in connexion with manure from other towns besides London. As already mentioned, it has been reported in the Hexham Rural District in connexion with manure from Newcastle, and in the Southwell Rural District in connexion with that from Nottingham.

Dr. Stainthorpe, Medical Officer of Health to the combined Sanitary Authorities in the Guisborough Union, makes the following observations on this subject in his annual report for 1891 :— In Guisborough combined district.

"In reporting to the Kirkleatham Sanitary Authority upon the three cases (in one house) occurring in their district in February, I stated there seemed to be some connexion between them and night soil brought from Middlesbro' by rail to the depôt at Kirkleatham crossing. On February 21st a consignment of night soil arrived at this depôt. On February 28th a child died from diphtheria after a few days illness; a fortnight later another child in the same house succumbed to the disease. Immediately before the development of the symptoms in the first child, both children, accompanied by their mother and grandmother, had, when out for a walk, passed the depôt when the grandmother noticed a foul smell which evidently proceeded from the night soil. The three cases at Brotton in October seemed also to be connected with night soil from Middlesbro'. The cases occurred in two houses widely separate and between which there was no communication. In one, the attack commenced on the 22nd, in another, on the 24th, and in the third, on the 27th. Night soil arrived at the Brotton depôt, which is in close contiguity to the passenger station on the 14th, and was spread over a field near the station. The person (an adult) who was attacked with diphtheria on the 24th had, on the 23rd, complained of a foul smell proceeding from this field. The other two patients resided at a farm a few fields away from that to which the night soil had been applied. In addition to these cases of diphtheria several others of sore throat existed about the same time, one of the patients being a railway official. It will be seen that of the 13 cases 11 occurred during the months of January,

February, March, October, November, and December, these months embracing the period during which night soil is most largely brought into the district.

"I have received several complaints of the nuisance arising from the unloading of night soil at depôts near passenger stations and dwellings, and the carting of it through streets during the day. That a serious nuisance and a danger to the public health is caused thereby I have no hesitation in saying.

"The value of the Middlesbro' night soil as a manure lies largely, I believe, in the blood and offal which it contains, and for this reason it is preferred by the farmers in this district to that collected in their immediate neighbourhood. It is these constituents which give it its frightfully sickening odour, and which probably also render it so dangerous, inasmuch as blood is one of the most suitable media for the growth and reproduction of disease germs. Moreover, germs which under their natural surroundings have only very slight disease-producing powers, may by propagation in such media as blood and offal, become virulent.

"So convinced am I of the danger surrounding the importation of town night soil into the districts that I strongly urge the various authorities in the union to form stringent regulations as to the distance of depôts from dwellings, the carting of it through streets during the day, and the placing of it on land near dwellings and highways."

The relation
discussed.

The instances quoted seem to point to some relation between diphtheria and manure effluvia, but what that relation is cannot be stated. So much is still unknown respecting the causation of diphtheria, that it is impossible in any given case to state positively that all other possible causes have been excluded; and more especially, owing to the difficulty of diagnosing the disease in its mildest degrees, there is always the doubt whether it may not have been already present in an unrecognised form, when the manure incident supposed to have caused it occurred.

Another difficulty is that diphtheria is a disease of the country rather than of the towns, although in late years its fatality has increased in the latter; the relation is not likely therefore to be simply one of the conveyance of specific infection.

The following hypotheses may be mentioned:—

1. That the manure forms a specially favourable breeding ground for specific organisms already existing in it, or which have gained access to it.

2. That in localities where sore throat allied to diphtheria already prevails the inhalation of manure effluvia imparts to a comparatively mild affection a more definitely specific and severe character.

3. That the action of manure effluvia, like that of other septic effluvia, is to produce a non-specific sore throat, upon which the specific germ of diphtheria is more readily engrafted than upon a healthy mucous membrane.

Other diseases.

Of diseases other than diphtheria attributed to manure effluvia, I have mentioned elsewhere in this report a case regarded as puerperal septicaemia (p. 12), and a form of illness described to me under the name of "dumb ague" (p. 7).

Dr. Anderson, Medical Officer of Health to the Seghill Local Board, says in his annual report for 1891:—

"The most severe cases of diarrhoea occurred in the Station Rows, and were caused by Newcastle Corporation manure being emptied from waggons when in a state of acute fermentation in the months of July and August. I therefore reported this matter to the Local Board, and recommended its discontinuance at this place in such close proximity to dwellings. No deaths occurred at this place, but several of the cases were of the most serious character.

In his annual report for 1891 Mr. Adams, Medical Officer of Health for Maidstone, mentions three cases of enteric fever associated with the deposit and transit through the town of London manure; but he informs me by letter that these cases were by no means conclusively connected with the manure nuisance. In each case there was no discoverable sanitary defect or cause for the disease other than the complaint made by the patient of the nuisance in question; neither of them being intimately brought into contact with the manure. Enteric fever would seem less likely to be conveyed by London manure in which human excrement is only exceptionally present than by that of towns in which a "dry" system of excrement disposal obtains.

Enteric fever.

The contagia of other infectious diseases may be present in house refuse and manure containing it. An outbreak of scarlet fever in the Samford Rural District, thought to have thus originated, has been mentioned above. I formerly met with a case in which a signalman at a country railway station in Yorkshire was taken ill with small-pox. No other case existed in the district, and no source of infection was ascertained except that at a siding about 50 yards from his box a quantity of night soil and house refuse from Manchester, where small-pox was prevalent at the time, had been recently unloaded.

THE NATURE OF TOWN MANURE.

The solid waste matters of a city or town are very various in character, but the kinds which are of importance in relation to this inquiry are the following:—

Composition of town refuse and manure.

1. Human excrement.
2. House refuse:—Consisting of coal ashes, together with broken crockery, &c. (hard core), animal and vegetable refuse (soft core), and miscellaneous refuse.
3. Street sweepings.
4. Dung of horses and other animals. (The dung removed from cattle steamers will require special notice.)
5. Offal, or refuse of food materials:—Consisting of waste animal matters from slaughter-houses, unsound fish, poultry, &c., also vegetable refuse from markets, greengrocers' shops, &c.

The mode of collection and the destination of these different classes of waste differ according to local circumstances. In London and other water-closet towns human excrement passes into the sewers, and is removed and dealt with as a liquid; but in towns in which a privy system exists it is dealt with as a solid, usually mixed with ashes and other refuse. Where the old-fashioned midden privy remains in use its contents do not undergo any kind of sorting beyond the occasional picking out of the coarser "hard core"; but where the pail-closet system is carried out, the excreta are often collected apart from the bulk of the dry refuse, and may undergo some preparation for the purpose of converting them into a manure more readily disposed of.

Human excrement.

The disposal of excrement by so-called "dry" systems is a large subject, and I do not propose to enter into it in this report. The recent experience of several towns will be found in my report to the Local Government Board on "Slop-closets and Trough-closets," contained in the Annual Report of the Medical Officer for 1890. The tendency in many urban districts at the present time—a tendency based both on financial and sanitary considerations—appears to be to replace these "dry" systems by water carriage.

In London where the house refuse is unmixed with excrement, and where owing to the mode of brickmaking in vogue there has been a

Domestic refuse.

demand for the "breeze" or fine ash containing a proportion of combustible matter, a process of sorting has been and is still commonly carried out; though the lessened demand for breeze on the part of brick-makers, owing to the depression of trade, has of late years rendered it less profitable thus to deal with the refuse. In districts in which it has been found impossible to dispose of such refuse profitably, owing to the cheapness of coal, and the consequent large bulk and low value of house refuse, or to the lack of land in the neighbourhood on which it can be utilised, the custom has often been to tip it into some pit or waste ground. But this practice is objectionable in populous localities, and especially where the land may afterwards come to be built on; and it is also in many districts increasingly difficult to find tipping places. Hence in many such places destructor furnaces for burning up the useless rubbish have come into use. There is still the resulting clinker, amounting to about one-third the original weight of the refuse, to be got rid of. In the northern and midland towns, where red and blue bricks are used, it can be ground up for mortar-making; but where light-coloured bricks are more generally used, such mortar, on account of its dark colour, is considered less suitable.

In London the removal of house refuse is undertaken or contracted for by the vestries as local sanitary authorities. Formerly when breeze was more in demand for brickmaking, they were paid for the privilege of removing it, but now the removal costs considerable sums of money. In the main streets of the City of London the removal is effected daily, the dust being placed in movable boxes on the pavement and emptied direct into the dust-carts on their rounds. Fixed ashbins of brick or wood, of a size to hold the accumulation of a week or more, are, however, the usual arrangement in metropolitan districts; though movable bins of galvanized iron are now coming into use, and are to be preferred.

The sorting of the refuse, as commonly carried out in London, is performed by women, who, standing on the heap of ashes, sift out with hand-sieves the fine ash or breeze. The remainder is picked over: the cinders go, like the breeze, to brickmakers,* the paper, rags, string, bottles of various kinds, broken glass, scrap-iron and tin, corks, leather, oyster shells, &c., all find their appropriate uses. The "hard core" is used for foundations of roads; but its removal has to be paid for. The "soft core," consisting of animal and vegetable putrescible refuse, is either burnt in a destructor, or goes for manure.

3. Street sweepings (road drift) are removed by the local sanitary authority, usually with their own staff. They consist of a mixture of—1. Grit or mineral matter derived from the wearing away of the materials forming the surface of the roadways; 2. Horse droppings; 3. A certain admixture of miscellaneous rubbish, as paper, orange peel, and other vegetable refuse; 4. A variable proportion of water. The proportion of mineral matter varies according to the nature of the road surface; being greatest in the sweepings from macadamized roads, and least in those from asphalted or wood-paved streets. The water varies in amount with the

* The breeze is incorporated with the clay of which the bricks are made; and as it consists partly of combustible matter, the bricks are thus made to contain their own fuel, the cinders being used underneath for lighting the "clamp" or pile of dry bricks. As both the breeze and the cinders contain organic matters which in burning give off an unpleasant smell, the business of brickmaking by this process is an offensive one. See p. 18, and also Dr. Ballard's report on Offensive Trades.

In other parts of the country bricks are burnt in kilns by means of fuel placed between and underneath them, not mixed into them, and the fuel is generally coal; so that the process is less offensive.

weather; so that the sweepings range in consistency from dry dust to liquid mud. The liquid renders the sweepings more difficult to handle, and has to be drained away as much as possible if they have to be transported for any considerable distance. Road drift, though useful to lighten heavy clay soils, has little manurial value, as the horse droppings do not contain the urine which forms the chief channel of excretion of nitrogen from the animal body. The sharp sand washed out of the sweepings from flint roads is used for cutting marble. Road drift is often used for filling up pits and lowlying ground, and where it cannot thus be got rid of it has to be sent away by London vestries at a dead loss. It is not offensive, and indeed has in some degree the deodorant properties of earth: hence it may be usefully employed to cover up other and more offensive materials.

4. Stable manure, the dung of horses and other animals, has a market value, and is usually disposed of by private agency, either direct to market gardeners or through manure merchants, some of whom do business on an extensive scale. The value of stable manure is, however, less now than formerly, and fluctuates at different seasons of the year according to agricultural requirements and the farmer's facilities for disposing of it.

Dung of horses
and other
animals.

Stable dung varies in character according to the quantity and nature of the litter used. That from gentlemen's stables contains a large proportion of comparatively clean straw, but in stables of a poorer class litter is less abundantly used, and the manure consists chiefly of horse dung. Peat litter, sawdust, and shavings are not unfrequently used instead of straw. In mews in which there are dwelling-houses the dung-pit serves as a receptacle for house refuse, and may even receive some human faecal matter.

Stable dung, like other moist vegetable matter, undergoes, when piled up, a process of fermentation attended with evolution of heat, and ammoniacal vapour is evolved from the decomposition of the urine which it contains. The temperature attained may reach 120° F. The process begins in a day or two and lasts for several weeks; it is accelerated by dampness and close piling, as in underground pits, and is retarded, on the contrary, by dryness and exposure to the air. If the manure be disturbed in the active stage of heating it is very offensive, but when thoroughly rotten it has comparatively little odour. In a heap added to from day to day there will always be some portions in an active and offensive stage of decomposition.

The way to avoid nuisance from the accumulation of stable dung, therefore, is to remove it from the neighbourhood of dwellings at frequent intervals before the heating has had time to progress far, and in the meantime to keep it dry and exposed to the air. The best arrangement for this purpose is an iron cage standing under cover on a paved surface sloping to a drain.

Stable dung is sent out of London by road, by rail, and by barge. Market gardeners and farmers near London sometimes have contracts with parties keeping horses to take their manure all the year round at so much per load, or they purchase it as a perquisite from coachmen or grooms. The carts which bring agricultural produce to London take back loads of manure.

To more distant places manure is sent by barge, if near a river or canal; if not, it is sent by rail.

The manure from cattle-ships is a peculiar kind, having a strong sour odour, as of fermentation, much more offensive than that of ordinary manure; and it is the source of much complaint at the riverside places to which it goes. Cattle are brought to this country from America in

Cattle-ship
manure.

large steamers. They are stalled in covered sheds fitted up on the upper and main decks, and are fed on the voyage on maize and on hay made of a coarse wiry grass, which also serves as litter. The manure is not removed during the voyage, but successive layers of litter are put over it; it contains more or less wasted maize, to the fermentation of which its pungent odour is probably due.

The importation of animals from foreign countries is subject to stringent regulations designed to prevent the importation of epizootic diseases. These regulations are contained in the Animals Order of 1886, made under the powers of the Contagious Diseases (Animals) Acts by the Privy Council, whose jurisdiction has been since transferred to the Board of Agriculture. Under this order foreign animals—the word “animals” including cattle, sheep, goats, and all other ruminating animals, and also swine—may be landed for slaughter in Great Britain only at ports having “Foreign Animals’ Wharves,” or “Landing Places for Foreign Animals.” These ports are London, Bristol, Glasgow, Grimsby, Hartlepool, Hull, Liverpool, Plymouth, Portsmouth, Southampton, Barrow-in-Furness, Cardiff, and Falmouth; the foreign animal wharves at the three latter ports, however, are rarely used. Animals from abroad, except those from certain “free countries,” must be landed at a Foreign Animals Wharf, and must be slaughtered within 10 days after the day of landing. Offal and manure can only be removed from a foreign animals wharf with the permission and under the direction of an inspector of the Board of Agriculture. Foreign animals from “free countries,” if not intended for slaughter, must be landed at a Foreign Animals Landing Place, where they are detained for at least 12 hours, and then, if found free from disease, they may pass inland like home-bred cattle. Manure from Foreign Animals Landing Places is delivered out of charge, unless the animals have been found to be diseased.

The foreign animals wharf for the port of London is at Deptford, and is the property of the Corporation of London. The cattle steamers either discharge there, or more often are met in the river below London by a steamer, the “Racoon,” belonging to the Corporation, which takes the cattle off to Deptford; and the cattle steamer then goes at once into dock, most commonly at the Tilbury, Victoria, or Royal Albert Docks, to discharge the rest of her cargo, to undergo cleansing, and to take in her export cargo.

The manure from cattle-ships is always discharged in dock into lighters or barges alongside, but it may not be removed from the deck except with the consent of the Customs, given upon the receipt of a certificate from the inspector of the Board of Agriculture at Deptford, testifying to the health of the cattle. The necessity of waiting for this certificate involves a delay in the removal of the manure. Until recently, in order for the Customs to pass the manure, it was necessary for the Board of Agriculture inspector to certify that the cattle were free from any disease. This could only be done after they were all slaughtered, as *e.g.*, the lungs had to be inspected for pleuro-pneumonia; and since ten days may elapse from landing, as above mentioned, before a cargo of cattle were all slaughtered, a delay undesirable in the interests of human health was thus apt to occur. Dr. Collingridge, Medical Officer of Health for the Port of London, informs me that in a crowded dock the close presence of the manure-laden lighters was often a source of great nuisance to other vessels. The delay would also permit decomposition to become further advanced, and thus increase the nuisance from the manure at its ultimate destination.

Professor Brown, of the Board of Agriculture, informs me, however, that arrangements have now been made by which this delay will be in great part avoided, as the Customs will now accept as sufficient a certificate from the inspector that the cattle are free from any disease capable of being conveyed by manure. The diseases of animals which are regarded as being capable of being conveyed by manure are, cattle plague, foot-and-mouth disease, swine fever, and sheep pox, and these can be detected without waiting for slaughtering. In the absence of any of these diseases the manure would be at once passed. In case of the presence of any of these diseases among imported cattle, Professor Brown tells me that their manure would not be detained in dock, but would be at once taken possession of by the Board of Agriculture, and destroyed at Deptford by mixing with its own weight of quicklime. This would prevent its being used for manure until decomposition was complete. In the last case which had occurred, a heap of manure so treated was kept for 12 months, and when removed was quite inoffensive. Such manure, however, would not be allowed to be used in agriculture, but would be taken out to sea and thrown overboard.

The Customs have power to prohibit the landing of manure from foreign cattle at any place on the shores of the United Kingdom; but not that of manure of home origin. This power of prohibition would probably be looked upon as having reference to the prevention of cattle disease, rather than of nuisance to human beings. The consent of the local authority under the Contagious Diseases (Animals) Acts,—*i.e.*, in boroughs, the Town Council, and in other urban or in rural districts, the Justices—is also required for the landing of manure from foreign animals.

The cattle-ship manure goes chiefly to Essex, and to Dartford, Greenhithe, and places on the Medway and Swale, in Kent; being conveyed in sailing barges, which bring back bricks or other cargo.

The manure from the cattle-ships is either put direct into the barges, or is thrown out into lighters, and thence transferred to the barges. (The difference between a barge and a lighter is, that the former carries a crew, who live for the time on board, whereas a lighter has no cabin.) This transshipment from lighter to barge, according to Dr. Collingridge, occasions an intolerable nuisance, if performed in dock, and he puts a stop to it there, causing it to be performed in the river near Barking, or requiring the sailing barges to be brought into dock, so that the manure can be put direct into them. No dock dues are payable on the barges; but the objection to loading direct into them is that it may involve the expense of keeping the crew, consisting usually of two men, waiting some days in idleness, whereas the lighters may be left without men. This objection, it may be expected, will be lessened by the altered practice of the Customs in passing the manure.

The cattle-ship manure is supposed to be disinfected by sprinkling it with a little lime, but neither Professor Brown nor Dr. Collingridge believes that, in the quantity ordinarily used, this has any appreciable effect even as a deodorant, still less as a true disinfectant. Dr. Collingridge would prefer that offensive cargoes should be covered with earth.

5. Offal and garbage, *i.e.*, waste food materials, articles of food which have been spoiled by over-keeping, and the unusable portions of such articles removed in preparation for the table, form a very offensive class of refuse, both from the rapidity with which they become putrid, and from the offensiveness of the products of their decomposition. Substances such as form the food of man, in putrefying outside the animal body, pass through the whole range of chemical changes between the fresh

state and complete decomposition into stable and innocuous products; and in so doing they give off gaseous matters more or less offensive at almost every intermediate stage. On the other hand, when eaten, digested, and assimilated, they are partially burnt up within the animal body, and the residual matters, when excreted, are partly on their road towards complete decomposition, having already passed through some of the stages at which, in the course of putrefaction outside the body, offensive effluvia would have been given off. For this reason putrid animal tissues are far more offensive than excreted matters. It cannot, however, be affirmed that they are more injurious to health; for injury to health is caused not so much by impressions on the senses (olfactory or other), or by chemical products of decomposition, as by specific infection, which is more likely to be present in excreted matter than in dead animal matter, although should it be present the latter would form a favourable medium for its multiplication.

Waste food materials may be classified thus:—

- (a.) Slaughter-house refuse.
- (b.) Fish, game, and poultry offal.
- (c.) Vegetable refuse.

From slaughter-houses.

(a.) Slaughter-house refuse.—There are few parts of an ox, sheep, or pig which are not utilised in some way. Besides the edible portions of the carcase and viscera, the blood, bones, waste fat, hide, horns, hair, bladder, and guts all find their appropriate uses.* The portions which are not utilised, otherwise than in the crude state as manure, are the more or less digested contents of the alimentary canal, certain viscera, as the paunch or first stomach of the ox, and “slink” (foetal) calves, together with a certain small quantity of blood and scraps.

Fish and poultry.

(b.) Fish and poultry offal.—This consists of the inedible parts of fish, poultry, and game, and of fish and fowl which have gone bad and are not saleable. Fish and poultry soon become putrid, and game would not usually be thrown away unless it were already far advanced in decomposition. This class of refuse is very offensive.

Vegetable refuse.

(c.) Vegetable refuse from markets, &c.—Green vegetable refuse when undergoing decomposition in a moist state is offensive. This is especially the case with cruciferous plants, as the cabbage and turnip, and also with the onion and its congeners; all these plants containing essential oils which have sulphur as a constituent. Green refuse also heats rapidly, by which the offensiveness of manure containing it is increased.

In the passage of food materials to the consumer, the refuse has to be got rid of, so far as our present purpose is concerned, at three stages viz., first at the markets, where food substances are dealt in wholesale; second, at the establishments of retail dealers; and third, in the households of consumers.

Offal and food refuse from markets;

1st. The offal from public markets in London is dealt with by public bodies.

There are two cattle markets in London, viz., Deptford, for foreign animals as before mentioned, and the Metropolitan Cattle Market, Islington, for home-bred animals and those brought by land. Each of these cattle markets has in connexion with it a range of abattoirs, and at these abattoirs a large part of the slaughtering in London is done. A very large quantity of dead meat is brought into London, both fresh, and

* For these uses, and for the nuisances arising from them in the absence of due care, or to some extent in spite of all ordinary care, I refer the reader to Dr. Ballard's report on Effluvia Nuisances in the Report of the Medical Officer of the Local Government Board for 1876.

in the frozen state from abroad, so that the quantity of offal produced in London by no means corresponds with the quantity of meat consumed there.

The manure and offal from the Deptford cattle market is loaded day by day into barges alongside. It is treated with lime in the proportion of a pailful per cartload, or about $1\frac{1}{2}$ tons to a barge-load, 100 tons, of manure; this is said to diminish stench. The manure was fetching at the time of my visit (December) 35s. per load of 100 tons. It is sent chiefly to places in Essex.

The Metropolitan Cattle Market, at Islington, is also the property of the Corporation of the city of London. I am informed by Mr. Hanman, market superintendent, that the whole of the manure and offal produced at this market is sold to one contractor, and is sent to places on the Great Northern Railway.

Killing takes place at Islington chiefly on Tuesday, Wednesday, and Thursday, in each week, little being done on Friday, Saturday, or Monday. The offal is sent away twice a week, Tuesday and Friday, in winter, and three times a week in summer. In the meantime it is stored on an open piece of ground near the slaughter-houses, where also the manure from the cattle pens is piled pending removal. It is sprinkled with carbolic acid in the proportion of about half a gallon to a ton of offal; this is said to be sufficient to keep it from stinking for a week. Anything specially offensive is buried in earth until it can be sent away, and when dug up is said to be found perfectly inoffensive. Diseased meat is saturated with carbolic acid, in order to render it uneatable.

The offal is taken to the manure siding at Maiden Lane, King's Cross, in the Corporation's carts and waggons. These are of wood and are not covered. The body of the cart is made to slide backwards and tip; so that when the cart is brought on to a raised platform and backed until the wheels are arrested by a plank at the edge, the whole contents of the cart are tipped at once direct into the railway truck. The railway company require the offal to be deodorised to their satisfaction, and with this view gas lime is used in the proportion of about 1 cwt. to a truck-load (8 tons) of offal. In loading the trucks a layer of long straw manure 6 inches thick is first placed at the bottom of the truck, to absorb liquid; a load of offal is then shot in and sprinkled with gas lime, and so on until the truck is full, when it is covered with another layer of long straw manure. The loading is not effected without some spilling of offal and draining of organic liquid on to the surface of the siding. At my visit, which was made in frosty weather, there was no offensive odour perceptible, but in hot weather it would doubtless be otherwise. There are, however, no houses very near the manure siding. The offal is said to be taken to somewhere near Peterborough, and to be buried until decomposed before it is put on the fields. I was assured that never more than two days would elapse between its being produced and its being unloaded from the truck at its destination.

The fish seized and condemned at Billingsgate Market, amounting to 90 or 100 tons per month, is taken possession of by the Fishmongers Company under their chartered rights, and is conveyed to Belvedere, Kent, where it is converted into artificial manure.

The putrid and diseased meat from Farringdon Market (the great market in London for dead meat) seized by the Commissioners of Sewers, which amounted in 1891 to 350 tons, is treated in their condemned meat shed. This is a shed with asphalte floor and white tiled walls, containing three large slate tanks, each of about 600 gallons capacity. These tanks are filled with a chemical solution in which the meat is steeped to deodorise it and render it uneatable. The liquid experimentally used at

the time of my visit was "Tuson's fluid," containing chloride of zine and sulphurous acid. Usually the bath most relied on is one invented in 1877 by the Medical Officer of Health for the City of London, and consisting of chlorides of calcium and sodium, protosulphate of iron and picric acid; the latter being the only material found to stain the fat, which it turns to a deep orange colour.

The antiseptic properties of the baths are such that putrid meat is at once deodorised therein, and meat can be kept in for a month without becoming a nuisance. After steeping for a few hours the meat is delivered to a contractor at Bow, who pays a small sum for it, and is bound under penalty not to sell it as human or animal food. He renders the fat, and uses the bones and fibre for making artificial manure.

Putrid poultry and foreign game are similarly dealt with at Farringdon Market. Not much fish is sold at this market, so the amount of condemned fish is small.

The sweepings and refuse from the central markets in London, consisting of vegetable refuse, straw, paper, sawdust, &c., with a certain admixture of animal matters, are removed for the Corporation by the Commissioners of Sewers, and taken to their depôt at Letts's Wharf, Lambeth. Here the dry materials, such as straw, baskets, paper, &c., if not worth utilising, are burnt in a destructor. The soft core is mixed with offal from shops, horse droppings from street orderly bins, and road sweepings (which in the City consist largely of organic matter), and the mixture is sold for manure and barged down the river to places in Kent and Essex. The price it will fetch varies. Sometimes 3*l.* a barge-load is got for it; at other times it has to be given away for nothing.

I am indebted to Dr. Sedgwick Saunders for the above particulars.

The private slaughter-houses in London are, comparatively speaking, not very numerous. The offal from them is often removed together with stable manure.

from retail
establishments;

2nd. The offal, food refuse, and broken food from retail establishments, such as butchers', fishmongers', poulterers' and greengrocers' shops, hotels, and restaurants, has, in part, a small commercial value, and such part of it is often collected privately for pig food, or for manure, or by rag and bone dealers.

Difficulty is often experienced in getting such stuff removed with sufficient frequency, as the private collectors do not care to call until a sufficient quantity has accumulated to make it worth their while to do so; and nuisance is apt to be created in the emptying of the vessels in which the refuse is stored and in the passage through the streets of the carts containing it.

Under section 33 (1) of the Public Health (London) Act, 1891, as under corresponding provision of previous Acts, the owner or occupier of any premises may require the Sanitary Authority to remove trade refuse, on payment of a reasonable sum for such removal; but there seems to be no power on the part of the Sanitary Authority to require trade refuse to be removed at frequent and regular intervals, though apparently if in any case it accumulated to such an extent as to appear to a sanitary inspector to be a nuisance, it might be required to be removed within 48 hours under section 35 (1) of the Act.

from private
houses;

3rd. The animal and vegetable food refuse of private houses for the most part finds its way to the dustbin, and is the chief cause of the offensiveness of that receptacle. A better plan is to burn it in the kitchen fire, but this involves a certain amount of trouble which servants or housewives are not always willing to take. The difficulties are that in a modern close kitchen range there is little space above the fuel; and that to put on a quantity of wet green stuff slackens the fire and interferes with cooking operations. On the other hand, if the refuse be kept

until the cooking is over, when there is a smaller fire and more room in the grate, it is less readily consumed. These difficulties are successfully met by a little invention—Tupper's Household Refuse Destructor—upon which Mr. Gordon Smith and I have recently reported jointly to the Board. It consists of a small iron cage fixed in the kitchen flue just above the grate. It has in front a door, which falls forward to form a hopper, into which refuse, such as potato parings, cabbage leaves, &c. can be thrown as produced, and while the fire is hot, with as little trouble as into the ashpit; and they are gradually dried and consumed away, the ashes falling through.

In some households, however, waste portions of food are saved for pig-feeding, being collected from time to time by pig-keepers who come round for them. Such collections are apt to give rise to nuisance, as mentioned in Dr. Ballard's Report on Effluvium Nuisances, already referred to.

Carrion or the carcasses of animals not used for human food may here be mentioned. Those of horses and asses are dealt with at knackers' yards, the different portions being utilised in various ways. The dead bodies of dogs and cats are often removed with stable manure or house refuse. The bodies of the dogs destroyed at the Home for Lost Dogs are disposed of for manure, and complaint has before now been made to the Board of nuisance arising when they have been used for this purpose in a populous neighbourhood.

PARTICULAR METHODS OF DISPOSAL.

The following are illustrations of the ways in which different classes of refuse are dealt with in practice at certain depôts visited by me in the course of this inquiry:—

Methods of disposal at particular establishments:

1. *Letts's Wharf, Lambeth*, is the property of the Commissioners of Sewers for the City of London, and all the refuse of the City proper is brought there. Mr. Swales, junior, the superintendent, informs me that the matters dealt with are as follows:—

Letts's Wharf.

1. Street sweepings.—As the City streets are mostly paved with asphalte, wood, or granite setts, the sweepings contain a larger proportion of organic matter, and less grit than those from districts where the roads are chiefly macadamised.
2. Contents of street orderly bins.—These consist of horse-droppings, which are swept up as they fall by boys, and placed in tall bins standing on the kerb. The droppings being dry, and containing no urine, have little offensive smell; but a little "soft core" is mixed with them.
3. Market sweepings from Smithfield, &c., consisting of straw, sawdust, cabbage leaves, and such like, also a small quantity, about a load a day, of refuse from Billingsgate Market, consisting of sweepings, with a certain amount of waste fish.

[The above are all mixed at the wharf by being thrown together into barges alongside. The manure is sent to farmers in Kent and Essex.]

4. House refuse, &c.—There are few fixed dustbins in the City, the ashes and dust being stored mostly in movable boxes. In the main streets these boxes have to be placed on the pavement before 8 a.m., and are emptied each morning into the dustcarts which perambulate the streets daily. In the side streets the dust is called for and is collected at any hour of the day.
5. Trade refuse.—This is collected with the house refuse, but its removal has to be paid for. It consists largely of packing materials from warehouses and shops, *e.g.*, paper, straw, boxes,

and baskets. Much of the offal from fishshops, restaurants, &c is collected privately for use as pig food, manure, fat rendering, or other purpose, and does not come to Letts's Wharf.

The house refuse is sorted, mostly by women and girls, who stand sieve in hand on the heap and sift the fine ash or "breeze" from the coarser materials, picking out from the latter and throwing into separate baskets such as are capable of utilisation. The destination of these is various; rags, string, and the best pieces of paper go to paper-makers; mineral water bottles are sold to a "Mineral Water Bottle Exchange Company," who return them to the manufacturers whose names they bear; wine bottles to bottle dealers; medicine bottles to people who wash them and sell them at the doors of hospitals for the use of out-patients; miscellaneous bottles to proprietors of shooting galleries; white glass to glass makers; green bottle glass to makers of emery paper; scrap iron, tinware, and other metal to dealers in old metal. Corks are ground up to make floor cloth. Old boots contain pieces of leather which can be used again. Even oyster shells find a use, being ground up to make shell gravel for canaries and poultry. The breeze is sold to brickmakers. The "hard core" is used for filling in foundations of new roads, but is of so little value that its removal has to be paid for; as has also that of the clinkers from the destructors in which is burnt the worthless part of the rubbish remaining after the sorting.

The work of sorting the refuse by hand is a repulsive one, as the women stand deep in the ash heap and become begrimed with dirt. They do not, however, consider it unhealthy; several whom I spoke to appeared robust, and said that they rarely or never suffered from illness except their somewhat numerous confinements. Mr. Swales gave me a table showing the result of inquiries which he had made in October 1888, of the women dustsifters as to the illnesses from which they had suffered. The table contains the names of 49 women of ages from 17 to 65 years. These had been employed at Letts's Wharf for periods ranging from 1 month to 21 years, or on an average $9\frac{1}{2}$ years, besides in many instances at similar work elsewhere, making a total average of 14 years. 30 of them had had children, the total number of children being 200, or an average of 6.6 children each. Of the 49, 41 stated that they had had no illnesses, apart from childbirth; 4 had suffered from accidents, 1 from "brain fever," 1 from "pleurisy," 2 (including one of those who had met with an accident) from "debility," and 1 from "pains across the stomach, six weeks."

Probably, however, none but robust women would engage in such an occupation.

Refuse Disposal
Co.

II.—*At the works of the Refuse Disposal Company* at Chelsea, where the dust collected from the parishes of Kensington, Chelsea, and Westminster is disposed of, no women are employed, and the sorting is done chiefly by machinery. The carts on arrival are tipped direct into a large revolving wooden screen with 3-inch spaces. This is boxed in, and connected with a fan which draws off the flying dust to the hearth of the furnace. A "worm" or spiral partition inside the screen carries the coarse matters which will not pass through the spaces to the far end, where they are picked over by hand; such as are of any value are separated, and the remainder ground up under edge runners.

The finer materials which fall through the first screen are carried by an elevator to a second revolving screen of $1\frac{3}{4}$ -inch mesh. Here the ashes and breeze fall through, the paper is blown out by a blast of air, and the coarser matters fall on to a revolving table, where they are picked over by boys, any saleable materials separated, and the rest ground under the edge runners. The ground material is carried back to the first screen. The separated paper and other suitable materials

are made into brown paper on the premises. The ashes and breeze which pass through the second screen are carried by a travelling endless band to a third screen of $\frac{3}{8}$ -inch mesh, by which the fine ash, constituting two-thirds of the bulk, is separated for the use of brickmakers. The breeze is burnt in a furnace with the aid of forced draught from the fans, and supplies steam for the working of the machinery. In summer the finest ash, under $\frac{1}{8}$ inch, is sifted out for the use of makers of blood manure, but there is no demand for this in winter.

In the present works, which are somewhat of an experimental character, the "soft core," which is the offensive part of the house refuse, is ground up small and goes with the fine ashes and breeze, but it is admitted that this destination is objectionable, as it heats and adds to the offensiveness of brick burning; and it would be better if it were sorted out and either burnt or put with manure.

III.—*The Manure Dépôt of the Newington Vestry, Manor Place, Walworth..* Newington
Vestry Dépôt.

The Newington Vestry make the collection and manipulation and disposal of refuse a large business, to the details of which their vestry clerk, Mr. L. J. Dunham, to whom I am indebted for much information, acts as manager. This business is carried on mainly on commercial principles, but I am assured that the sanitary aspect is not lost sight of.

The Newington district in South London having no river frontage, being surrounded on all sides by other populous districts, and being remote from any open country, the problem before the Vestry was how economically to get rid of the street sweepings, which, as many of the streets are macadamised, are considerable in amount. This problem they have endeavoured to solve by mixing them with stable manure purchased for the purpose, and selling the mixture.

The Vestry have a large town dépôt in Walworth, crossed by the viaduct of the London, Chatham, and Dover Railway, on to which trucks can be raised by a hydraulic lift. They have also country dépôts at Meopham and Longfield, and have recently purchased one at Sevenoaks; all these places being in Kent and adjoining the London, Chatham, and Dover Railway.

The stable dung is fetched by the vestry with their own waggons, and they pay large horseowners for the privilege of removing it. Small owners, such as costermongers who keep a pony or donkey, bring manure and deposit it at the dépôt without payment. The manure is used to make dams to retain the liquid road slop until the watery part has drained off. The two materials are mixed together and the mixture is allowed to remain in heaps until heating is over, when it is put into trucks and sent away by rail to farmers or to the country dépôts.

This practice involves the retention in the centre of a dense urban district of a very large quantity of manure in the heating stage. The quantity varies from time to time according to the time of year and the character of the season—wet weather preventing its removal on to the land. At the time of my visit on January 6th, 1892, there were 4,000 or 5,000 tons in stock, but I have been informed that the quantity has since been much reduced.

The Medical Officer of Health, Mr. Millson, however, informs me that no complaints of nuisance from the dépôt have been received by him, nor has he been able to trace any excess of fever or other sickness in its neighbourhood as compared with the rest of the parish. The immediate neighbourhood of the dépôt is mostly occupied by yards, &c., and the nearest row of houses is 62 feet distant from it. It is considered that the admixture of the road drift diminishes the offensiveness of the

manure, and also that less nuisance is created by leaving the manure undisturbed until the heating is over, or nearly so, than by removing it when hot.

Little fish offal, slaughter-house offal, or vegetable refuse comes to the depôt. Such as is received is stated to be at once placed in trucks and sent away to the country.

The household dust of the parish is also collected by the Vestry, and brought to the depôt, where a portion of it is sifted by hand in the usual manner to sell. The valueless dust is sent by rail to shoots at Longfield and Sevenoaks at a cost of 1s. 8d. per ton for carriage, and 2½d. per ton for unloading. Screened ashes from Longfield depôt are supplied to brickfields lower down the line.

The total amount of stuff dealt with by the vestry from Newington alone is at present about 45,000 tons a year, for a population of 115,663. In addition to this the vestry also received up to March 1892 the refuse of the parish of St. George's, Southwark; but this arrangement has now been terminated.

As regards the cost of disposal (apart from that of collecting) the vestry clerk gave me the following return:—

VESTRY, ST. MARY, NEWINGTON.

RETURN showing the actual Receipts and Expenditure attending the disposal of House Refuse and Road Sweepings, and the Loss arising thereon, for the year ending 25th March 1890.

HOUSE DUST.

<i>Receipts.</i>	£ s. d.	<i>Expenditure.</i>	£ s. d.
Amount received from		Screening - - -	833 0 8
Wandsworth Board -	200 13 11	Loading into trucks -	142 19 6
Sale of 12,165 tons -	1,497 5 9	Railway carriage on	
Trade refuse - - -	41 2 8	17,456 tons -	1,663 18 10
Sale of rags, bones, &c. -	34 3 7	Unloading dust at Long-	
*Balance against - -	1,829 16 1	field - - -	71 19 2
		Commission on sales -	92 8 10
		Proportion of establish-	
		ment charges - - -	798 15 0
	<u>£3,603 2 0</u>		<u>£3,603 2 0</u>
*Or 2s. 2d. per ton loss.			

MANURE MIXTURE (i.e., Road Sweepings, &c.).

<i>Receipts.</i>	£ s. d.	<i>Expenditure.</i>	£ s. d.
Sale of 21,236 tons -	3,144 6 4	Loading into trucks -	261 4 8
Rent, Meopham land -	5 0 0	Unloading at country	
*Balance against - -	1,443 11 3	depôts - - -	52 3 4
		Railway carriage on	
		21,190 tons - - -	2,201 0 7
		Commission on sales -	176 19 4
		Stable dung - - -	932 11 1
		Proportion of establish-	
		ment charges - - -	968 18 7
	<u>£4,592 17 7</u>		<u>£4,592 17 7</u>
*Or 1s. 4½d. per ton loss.			

SUMMARY.

		£	s.	d.
Loss on house dust	-	-	1,829	16 1
Do. mixture	-	-	1,443	11 3
Interest on capital	-	-	1,440	0 0
			<u>£4,713</u>	<u>7 4</u>

Or a loss of 2s. 5½d. per ton on 38,646 tons, including interest on capital.

L. J. DUNHAM,

Vestry Hall, Walworth, S.E.,
15th April 1891.

Vestry Clerk.

Questioned as to the advantage of purchasing manure to mix with the road sweepings, if the mixture had to be sold again at a loss of so much per ton upon an increased tonnage, he replied that it enabled the road sweepings to be better dealt with, and got rid of with some return, whereas otherwise they would have to be sent out of the district by rail at a dead loss, which he estimated at 3s. 6d. per ton, as follows :—

	s.	d.	
Railway carriage	-	1 8	per ton.
Unloading carts and levelling trucks	-	0 0½	„
Labour for banking slop	-	0 1	„
Loading into trucks (when sufficiently dry)	-	0 3	„
Unloading at shoot	-	0 2½	„
Establishment charges	-	0 6	„
		<u>2 9</u>	
Interest on capital expended	-	0 9	
		<u>3 6</u>	per ton.

(irrespective of value of shoot).

During the year ending March 1891, 11,000 tons of manure were bought, and 33,000 tons of mixture were sold. Disregarding the manure brought to the yard free of cost (against which would have to be set the diminution in the bulk of the road slop through the draining off of the liquid parts) this would leave 22,000 tons as the amount of road sweepings to be got rid of. A loss of 3s. 6d. per ton on 22,000 tons would amount to 3,850l., whereas a loss of 1s. 4½d. per ton on 33,000 tons would amount to 2,268l. 15s. 0d.

THE STORAGE AND TRANSPORT OF MANURE CONSIDERED WITH A VIEW TO PREVENTION OF NUISANCE.

In the preceding pages we have considered the nature and origin of the materials which constitute the solid refuse of a town, and more especially of such as, without any process of manufacture, go direct to the land as manure. The course of such materials from their place of production to their final application to the land may usually be divided into the following stages, viz. :—

1. Storage where produced.
2. Collection and carting to wharf.
3. Carriage by rail or barge.
4. Unloading at wharves.
5. Storage at wharves.
6. Carting from wharves.

Storage and transport of manure.

Stages.

7. Storage on land.

8. Application to land.

[Some of these stages, however, may be omitted in certain cases, as in that of the manure collected by market gardeners from stables and carted direct to the land.]

At each of the above stages nuisances and dangers to health may arise.

Storage where
produced.

1. The storage of putrescible matters in the place of production is probably the stage at which they are most likely to be deleterious to health, for the reasons that the storage often takes place near to dwellings, the inmates of which are thus exposed to the influence of the products of decomposition continually and not merely occasionally; and that, as there is reason to think, it is in a comparatively early stage rather than in the later stages of decomposition that injurious products are most apt to be formed.

The question of the prevention of nuisances from accumulations of organic refuse at the place of production is a wide one, embracing indeed a large part of sanitary administration, but it hardly comes within the scope of this report to consider it further than to remark that the general principles to be had in view are to remove all such refuse from the neighbourhood of dwellings at the most frequent practicable intervals, preferably daily; and in the meantime to store it at a sufficient distance in watertight receptacles of a capacity no greater than necessary, and having a smooth and non-absorbent surface; the contents being kept dry by the exclusion of rainfall, of ground moisture, and as far as possible of admixed liquid, and by the use of suitable absorbents.

Ample legal powers for the carrying out of these principles as regards excrement, house refuse, manure, and slaughter-house refuse are given as regards extra-metropolitan districts, by various sections of the Public Health Act, 1875, and by the byelaws which may be made thereunder. For London analogous powers are given in various sections of the Public Health (London) Act, 1891.

Collecting and
carting through
town.

2. The collection and cartage through London (which usually takes place in uncovered carts) of household refuse, manure, and food refuse occasions a certain amount of nuisance, varying with the nature and staleness of the materials and the state of the weather. This might be prevented so far as the cartage is concerned by requiring the carts or vessels to be covered, and by arranging that this traffic shall take place under due control at hours when the streets are less frequented.

Section 16 (2) of the Public Health (London) Act, 1891, requires that the County Council shall make byelaws *inter alia* (a.) for prescribing the times for the removal or carriage by road or water of any faecal or offensive or noxious matter or liquid in or through London, and providing that the carriage or vessel used therefor shall be properly constructed and covered so as to prevent the escape of any such matter or liquid and as to prevent any nuisance arising therefrom.

Byelaws for this purpose are now under consideration.

To Urban Sanitary Authorities outside of the metropolis the power to make similar byelaws is given by section 44 of the Public Health Act, 1875, and more explicitly by section 26 (1) (a), (b), and (c) of the Public Health Acts Amendment Act, 1890, where this latter Act has been adopted. The making of byelaws under these sections is permissive and not compulsory as in London.

To Rural Sanitary Authorities urban powers under these sections may on their application be granted by the Local Government Board, and such Authorities are then able to make similar byelaws.

3. Manure is removed out of London by rail, and by barges on the river and canals. It is also conveyed by road to market gardeners and farmers within a comparatively short distance of London; the waggons which bring agricultural produce often carrying back manure. The passage of these waggons along the streets occasions, as already remarked, a certain amount of nuisance. I have not heard any complaints of nuisance from manure in its actual transit by rail or water, except where the trucks or barges have been detained close to houses or to other vessels.

Carriage by rail,
water, or road.

4. The unloading of the manure at the wharves or sidings to which it is consigned occasions, on the other hand, nuisances of a very grave character for which it is difficult to find a remedy. The time occupied in loading and on the journey, usually greater in the case of a barge than of a railway truck, allows the manure to become heated, and any animal refuse which it may contain to pass into an active state of decomposition; so that the process of unloading, which is done by manual labour, is an extremely offensive one. Any superficial application of deodorants would be useless, as each stroke of the dung-fork exposes a fresh surface of manure, and scatters the offensive vapours into the air. On the other hand, any application at the time of loading of antiseptic or deodorant chemicals in quantity sufficient to retard putrefaction or to deodorize the entire mass would be out of the question on the ground of expense, and would probably deteriorate the value of the manure. The only available means therefore of lessening the offensiveness of the manure on its arrival seem to be to shorten as much as possible the time in transit, and in loading to mix specially offensive materials with cheap deodorants such as lime, earth, charcoal, or road grit. A certain degree of offensiveness, however, appears inevitable, and if it affected only those who voluntarily engaged in the handling of the manure would hardly afford ground for interference with a necessary trade, unless the evidence of injury to health were very cogent.

Unloading at
wharves
occasions grave
nuisance.

The chief ground for complaint, however, with reference to the unloading of manure is the unsuitable position of the siding and landing-places at which it is unloaded, which are often close, and sometimes most objectionably so, to public thoroughfares and inhabited buildings. Many examples will be found in an earlier part of this report, the most extreme instances being perhaps Swanley Junction (page 4) and Greenhithe (page 11).

Besides the offensiveness of the act of unloading, the filth-sodden condition of the ground at wharves where manure is habitually unloaded occasions a permanent nuisance of a serious kind. The spilling of a certain amount of manure is inevitable, and the spilled manure gets ground up by cart wheels and washed in by rain. Liquid filth dropping from the manure as it stands in trucks on the sidings also soaks into the earth, which is thus rendered black and offensive.

The only effectual remedy for nuisance at this stage, as it appears to me, would be to forbid the unloading of manure within a certain distance of inhabited buildings, and I would suggest the distance of 100 yards as a reasonable one under ordinary circumstances, though I do not think that it would in all cases be sufficient for the prevention of nuisance. A distance of 100 yards from any inhabited building is commonly fixed in byelaws made under the second part of section 44. Public Health Act, 1875, as that within which any transported filth must not be allowed to remain for longer than a specified period (usually 24 hours), unless effectually deodorised.

Difficulty of
prevention.

[It is to be observed that a byelaw forbidding the deposit of manure near inhabited buildings for more than a specified time

is of no use towards the prevention of the nuisance now under consideration, viz., that which arises during the act of unloading. This may be very grave, although the manure be at once conveyed away, and not suffered to remain on the wharf at all.]

Serious as is often the nuisance from unloading of manure, much difficulty is experienced in bringing to bear upon it the powers for the abatement of nuisances conferred by the Public Health Act, 1875. This difficulty arises from the following proviso to section 91 of that Act, "Provided:—
 " first, that a penalty shall not be imposed on any person in respect
 " of any accumulation or deposit necessary for the effectual carrying on
 " any business or manufacture, if it be proved to the satisfaction of the
 " court that the accumulation or deposit has not been kept longer than
 " is necessary for the purposes of the business or manufacture, and that
 " the best available means have been taken for preventing injury to the
 " public health thereby."

Although the quantity of manure at an unloading place may at any given time, or at all times, be very large, yet if it be taken away as fast as it comes, so that no one portion remains more than a short time, it is often held that the exemption quoted applies, and that there is no ground for proceeding against either the owner of the manure or the persons bringing it.

Can unloading of manure be prohibited at places where it causes nuisance?

How far this is correct in law I am not competent to say; but the following instances seem to show that Sanitary Authorities are not entirely powerless under these circumstances.

Case at Burnham.

Dr. Thresh states that on his advice the Maldon Rural Sanitary Authority in 1889 prohibited the unloading of manure at a wharf in the middle of the village of Burnham. The ground for this advice was that outbreaks of diphtheria had from time to time occurred in Burnham, which were so closely associated with the unloading of London manure at this wharf as to raise in his mind a strong suspicion, and in that of the local medical men, a decided opinion, that they were due to it as a cause. During the three years since this prohibition was carried into effect only a single case of diphtheria, and that an imported one, has occurred in the village, whereas 10 deaths from diphtheria and 5 from membranous croup had occurred in the two years, 1888-9, before the prohibition.

As regards the legal authority for this prohibition Dr. Thresh writes: "When I entered upon my duties here I found the unloading of manure already prohibited *during the summer months*. There had been no case of diphtheria, so far as I know, during the summer; but directly after the first load came in the autumn cases occurred, and I went over to investigate the cause. As the result I recommended the Authority to make the prohibition absolute at Burnham, as the manure could just as easily be landed either above or below the village. Our power to do so was doubted; but I pointed out that if they could prohibit it during the summer months, they could do so during the winter also. The feeling was so strong in Burnham, and among the members of the sanitary committee, that they issued a notice saying that anyone unloading manure in the village would be prosecuted for causing a nuisance. I expect we should take proceedings under section 91, Public Health Act. But we never anticipated any trouble, and have had none."

At Chartham.

In another case the Bridge Rural Sanitary Authority successfully prosecuted the South-Eastern Railway Company for a manure nuisance at Chartham Station.

Respecting this case, Dr. Robinson, Medical Officer of Health for the East Kent combined sanitary districts gives me the following particulars.

"The nuisance was occasioned by fish manure placed in trucks and unloaded at a siding of the South-Eastern Railway, at Chartham, in the Bridge Rural Sanitary District. Whenever the Inspector of Nuisances complained, the specific loads were removed, and the nuisance was thus abated, but only to recur at irregular intervals. The Sanitary Authority therefore not only laid an information for an offence committed upon a certain day, under section 91, 38 & 39 Vict. c. 55. but proceeded also under section 96, for a prohibitive order against the use of the siding for deposit and unloading of manure, and the Justices made this order so as to prevent a recurrence of the nuisance. The order was obeyed, and no appeal was made by the Company."

From a sanitary point of view it certainly seems that there should be legal power either to prohibit generally the unloading of offensive and noxious matter within a specified distance of inhabited buildings, or to prohibit the unloading of manure at any particular place where it has been proved to give rise to nuisance.

There are, no doubt, obstacles to forbidding by general enactment the unloading of manure within a specified distance of houses. Thus:—

- (a.) A hard-and-fast rule might be difficult of application. A distance, for instance, which in one case was not more than sufficient, might in another be unreasonably great.
- (b.) The vested interests and statutory obligations of railway companies and others could with greater or less force be pleaded against uniform legal enactment.
- (c.) Prohibition everywhere of the use for manure purposes of a wharf or siding within a definite distance of dwelling-houses, could with some show of reason be resisted, unless erection of dwellings within a like distance of any already established wharf or siding devoted to the manure business were at the same time prohibited.

Perhaps the end in view might be sufficiently attained by means of byelaws, which, while embodying principles, might permit of modification in satisfying the different (and legitimate) local requirements of one and another district. In this connexion I cite certain byelaws recently drafted by the Board's legal adviser, to meet the wants of a particular district.

"No person shall unload or deposit within 100 yards from any street, or from any building used for human habitation or as a school or place of public resort, or in which any person is employed in any manufacture, trade, or business, any filth emitting a stench, and brought to the place of unloading or deposit for the purpose of being removed therefrom.

"Every person who shall unload or deposit any filth emitting a stench, and brought to the place of unloading or deposit for the purpose of being removed therefrom, in any place within such a distance from any building used for human habitation or as a school or place of public resort, or in which any person is employed in any manufacture, trade, or business, that the stench is likely to cause offence to the persons in such building (although such place be not within the distance of 100 yards from such building) shall cause such filth to be forthwith covered with a sufficient layer of earth, or other suitable substance, or shall adopt such other precautions as may be sufficient to prevent the emission of any noxious or offensive effluvia from the filth."

But in the event of the regulation of manure traffic being left to be dealt with by byelaw there will be need for the Central Government to be empowered to require sanitary authorities to make byelaws in this subject-matter if it should see fit to do so. At present the Board has no such function, nor does the Board of Trade, as I learn from Sir C. Boyle,

possess any power under which they can govern the action of railway companies in receiving, conveying, and delivering manure of which they are the carriers. And if the Local Government Board is to regulate sanitary authorities in the above sense, it is obvious that the Board of Trade should at the same time be empowered to regulate railways and other carriers of manure and other filth.

Regulations of
railway com-
panies as to
manure traffic.

In reference to this part of my subject, I have been in correspondence with the goods managers of the principal railway companies running out of London as to the precautions taken by the companies themselves to avoid nuisance from manure traffic. Their replies are to the following effect :—

South-Eastern.

South-Eastern Railway.—Mr. Light, goods manager, writes :—

“As regards ordinary stable manure we have not any special regulations, taking it for conveyance all the year through.

“For animal or fish refuse we have special regulations, as shown by the form of consignment note which I send you herewith.”

No. _____

SOUTH-EASTERN RAILWAY.

CONSIGNMENT NOTE for Manure, containing or consisting of Animal or Fish Refuse.

The South-Eastern Railway Company hereby give notice that they decline to accept for conveyance, from the 1st July to the 30th September inclusive, consignments of manure, loose, or in bags, casks, or other receptacles, consisting of or containing animal or fish refuse. From 1st October to the 30th June inclusive, the Company will accept such manure traffic for conveyance, providing it is fresh and entirely free from offensive odour, upon sender prepaying carriage and signing the undertaking at foot, authorising the Company to sell or otherwise dispose of the manure, if not removed by Consignee within six hours after the arrival of the consignment at the station of destination, and agreeing to defray the Company's charges, and all expenses incurred by the sale.

To the SOUTH-EASTERN RAILWAY COMPANY,

Receive and forward the under-mentioned consignment on the conditions named herein.

Station.

188 .

Owner and No. of Truck.	Consignee.	Address.	Station.	No.	Description.	Weight.				Paid.	By whom received.	Remarks	
						Tons.	Cwts.	Qrs.	Lbs.	£	s.	d.	

In the event of Consignee neglecting to remove, or refusing to remove, this consignment within six hours after arrival at the station of destination, I hereby authorise the South-Eastern Railway Company to sell, bury, or otherwise dispose of the whole of the manure, or such portion of the whole as may be remaining upon their premises at the expiration of the time before mentioned, and to apply the money arising from such sale, if effected, in satisfaction of their charges for freightage and the costs and expenses incurred by reason of such sale or other disposal, the Company undertaking to pay over to me the balance, if any, after such charges, cost, and expenses as aforesaid have been deducted, and I further agree to pay to the South-Eastern Railway Company any money that may be due in respect of their charges, costs, and expenses, in the event of their having by the sale, or by otherwise disposing of the manure, failed to recover sufficient money to meet the said charges, costs, and expenses.

WITNESS { Name _____
Address _____
Date _____

SENDER'S OR
HIS AGENT'S
SIGNATURE. { Name _____
Address _____
Date _____

London, Chatham, and Dover Railway.—The regulations in force with reference to manure containing or consisting of animal or fish refuse are similar to those on the South-Eastern Railway.

L. & S.W.R.

London and South-Western Railway.—Mr. Owens, goods manager, writes:—

"The company does not undertake the loading or unloading of manure. We have no special regulations in force as regards its carriage, but we have, during the summer months, stopped its transit to certain suburban stations."

L.B. & S.C.R.

London, Brighton, and South Coast Railway.—Mr. Staniforth, goods manager, says:—

"I am not able to furnish you with copy of any general instructions relating to the conveyance of manure on this railway. Extending over a number of years there have been many letters written by my department to the company's station-masters and others, concerning precautions necessary to be taken for the prevention of nuisance, but these letters had bearing upon circumstances arising out of the season of the year, the particular description of the manure conveyed, or the exceptional conditions applicable to particular stations. Further than this, we have had correspondence at various times with our agents at London stations upon the importance of only inoffensive manure being accepted by us, and the strict measures to be enforced in respect to certain dealers suspected of surreptitiously covering up unwholesome matter in trucks ostensibly loaded with stable manure."

"The directions given by me to station-masters at stations where residential property adjoins the station have been to use their best efforts to secure the removal of manure at times when the least nuisance was likely to be created, and to use such influence with consignees as they are able to this end. The company is, however, very much in the hands of the consignees in this matter, being bound to fulfil their obligations as common carriers, but nevertheless find general willingness on the part of the consignees of manure to study the circumstances of any particular locality."

G.W.R.

Great Western Railway.—Mr. Wilkinson, chief goods manager, says:—

"The company have no separate regulation to govern the loading, conveyance, and unloading of manure traffic."

"A fractional part of the manure traffic dealt with upon the company's system is no doubt in certain circumstances and at certain seasons of the year of a disagreeable character, and in cases coming under this category, where they are established, we exercise our common law rights, and decline to carry. This has in the past been found sufficient."

"In certain cases of a doubtful character we have objected to receive manure traffic upon Saturdays, because we have known that in regard to such consignments there has been considerable risk of their being kept on hand at the receiving stations until Monday."

L. & N.W.R.

London and North-Western Railway.—Mr. Harrison, chief goods manager, informs me:—

"There are no special regulations of a general character. The traffic, so far as this company is concerned, principally consists of stable manure. I presume your inquiry refers more particularly to the removal of night soil, and I may say that this is not forwarded frequently from places on this company's railway, and generally the loading is performed during the night."

Midland R.

Midland Railway.—Mr. Adie, goods manager writes:—

"With respect to the loading, unloading, and carriage of manure, I beg to inform you that we have no special printed instructions upon the subject, of which I could send you a copy, but it is our practice to deal with the traffic as promptly as possible, and where we are required to place waggons for the purpose of its conveyance into the agricultural districts, sidings are used—as far as it is possible to arrange—away from the passenger stations or dwelling-houses, in order to obviate to the greatest possible extent any unpleasantness arising from it.

"At our London stations, where the greater portion of this traffic is dealt with, strict instructions have been given by my directions to supervise as carefully as possible the loading of it, in order to prevent the introduction of fish offal and other obnoxious matters."

G.N.R.

Great Northern Railway.—Mr. Twelvetrees, chief goods manager, says:—

"We have no written or printed regulations as to the conveyance of town manure, but at various periods have had strong complaints from the local authorities as to the offensive smell at some of our stations.

"So far as King's Cross is concerned we keep a very sharp watch on the loading of manure, and prohibit the loading of slaughter-house offal, fish manure, or such like offensive matters.

"At one or two of our Lincolnshire stations we have had complaints from the passengers of the offensive smell of manure, where dealt with in sidings contiguous to the passenger stations. In these cases we have minimised the complaints by having the waggons unloaded as far away from the passenger stations as possible."

It will be seen from page 29 that the above statement has to be qualified in so far that the company receive at their manure siding at Maiden Lane, King's Cross, offal from the Metropolitan Cattle Market, though they will not receive it except from the Corporation of London, and they require it to be deodorised to their satisfaction. I saw there a notice on a board as follows:—

"Great Northern Railway. Manure traffic.—Notice is hereby given that any person or persons loading into the company's waggons fish offal, animal matter, decayed vegetables, or other refuse likely to create a nuisance, will be prosecuted as the law directs.

"By order."

I was informed that before any truck was loaded with offal the company required a consignment note to be placed on it, and ascertained by telegraph that a siding at the place of destination was clear for its reception. These precautions do not apply to ordinary manure.

G.E.R.

Great Eastern Railway.—In an interview which I had with an official of the goods department of this line, he stated that great quantities of stable and other kinds of manure were conveyed thereon. There were no special regulations, except as to fish manure. This latter is not conveyed during the summer months (May 1st to August 31st). In the remaining months it is conveyed under special conditions as follows:—

"Whereas the consignor hath applied to the company to carry for him from time to time consignments of fish for manure. And whereas the company refuse to carry fish for manure, on account of its offensive smell, except under the special conditions herein-after set forth. It is witnessed that the consignor and the company hereby mutually agree as follows, viz.:—

"1. The company shall from time to time during the continuance of this agreement carry for the consignor fish for manure; provided that the same shall not be consigned to places beyond their own system of railways.

"2. The fish for manure shall in all cases be loaded by the consignor in such part of the station or stations or other places whence the same shall be consigned as the company shall direct, and in such a manner and at such times as not to cause any annoyance or nuisance to the passengers by the company's railway.

"3. The consignee shall unload every consignment of fish for manure as early as possible after its arrival and at such a place in the station as the company may direct, and in such manner and at such times as not to cause any annoyance or nuisance to the company's passengers, and in default of his doing so the consignor shall indemnify the company against all loss, costs, damages, and expenses which the company may sustain in consequence thereof. If in the judgment of the company's station-master for the time being any consignment of fish manure is a nuisance to the passengers using the line of railway, or to the public generally, the station-master may at once order such manure to be disposed of by way of sale or destroyed, such sale or destruction to be made by the company at the cost of the consignor, who shall upon demand repay them their costs of sale or destruction. In case of sale the amount realised by such sale less any outstanding charges due from the consignor shall be paid to the consignor.

"4. All consignments of fish for manure, whether 'carriage paid' or 'carriage to pay,' shall be carried at the expense of the consignor, and the charge for the carriage and all other charges, if any, upon every consignment (unless the same shall be tendered by the consignee at the time of receiving the consignment), shall be paid by the consignor on demand.

"5. Every consignment of fish manure under this agreement shall be carried at the sole risk of the owner, except that the company shall be liable for fraud or the wilful act or wilful default of their servants, if proved, and in case the consignor shall not be the owner, the consignor shall indemnify the company against all claims to be made by the owner arising otherwise than from such fraud or wilful act or wilful default of the company's servants, if proved as aforesaid, and against all costs, charges, damages, and expenses in anywise resulting otherwise than from such fraud or wilful act or wilful default of the company's servants as aforesaid.

"6. This agreement shall continue in force until 30th April 18 , unless it shall be determined prior to that date by one party giving to the other of them one week's notice to that effect.

In witness whereof the said

and

two of the

directors of the company, on behalf of the company have hereunto set their hands the day and year first above written.

Witness _____

Fish manure is conveyed only from Stratford and Devonshire Street stations and goes to various places. It is collected by dealers from fish shops, and the quantity of it is not very large. The company have not received many complaints of nuisance from manure traffic; those that they have had have come chiefly from suburban residential places, and mostly when slaughter-house offal has been mixed with the manure. Station-masters have a discretionary power to refuse or deal with any offensive matter. The manure is conveyed in ordinary trucks which are not covered nor water-tight. There would be great difficulty, I am informed, in keeping special trucks for manure traffic, unless they were only used to ply between particular stations, as it is not the custom to keep a record of the whereabouts of individual trucks so long as they are on the system of the railway company owning them.

From these replies it appears that the offensiveness of the manure traffic and especially of offal and fish refuse is recognised by railway

companies and that some precautions are taken to prevent its becoming a nuisance. The success will no doubt largely depend upon the care with which they are carried out: it does not seem to have been greatest on those lines which have on paper the strictest regulations. Among the instances mentioned in an earlier part of this report of nuisances from railway traffic in manure it will be observed that in respect of the best appointed and best managed railways, few complaints as to manure nuisances have been made, or if any have been, effectual steps have been taken to remedy them.

5. Storage at the place of unloading takes place chiefly in the case of manure brought by water to wharves which belong to private owners. Storage at wharves. Here the manure may lie awaiting the convenience of the consignee to fetch it away. Or the manure may be the property of a dealer, and may lie on the wharf until he can find a customer for it. In the early stages of decomposition when the manure is actively heating, it is very offensive, especially if disturbed when hot, and may occasion great nuisance to persons living near; but when decomposition is complete it is comparatively inoffensive. It has then, however, lost its offensiveness through having meanwhile given off the ill-smelling and noxious volatile products of decomposition into the surrounding air.

There would appear to be no legal difficulty in dealing with a nuisance of this kind. An accumulation or deposit which is a nuisance or injurious to health comes within section 91 (4) of the Public Health Act, 1875, and in this case it cannot truly be pleaded that the deposit has not been left longer than necessary for the purposes of the business. It also comes within the scope of byelaws which may be made in an urban district under section 44 of the same Act, for the prevention of nuisances arising from filth, dust, ashes, and rubbish. The byelaws (7 and 8) in the Board's Model Series on this subject, which have been largely adopted by sanitary authorities, provide that the owner or consignee of any cargo or load of filth (or any person who may have undertaken to deliver it to him), conveyed by land or water to any place in the district and deposited to await removal, without adequate means of preventing the emission of stench therefrom, within a specified distance (usually 100 yards) of any street or inhabited building, shall not allow such filth so to remain without reasonable excuse for longer than a prescribed period (usually 24 hours). [Neglect on the part of the owner of the wharf at which the manure is allowed to lie may not seem at first sight to be provided for, but I am informed by the legal department that he may be considered a person who has undertaken to deliver the cargo to the consignee.]

Some difficulty may occasionally arise from the words "without reasonable excuse" being interpreted with undesirable latitude. The reason, however, why deposits of manure are allowed to remain in objectionable proximity to houses (*e.g.*, at Dartford, p. 13, and Milton, p. 15, at each of which places I found hundreds of tons of manure which had been lying for lengthened periods within 100 yards from inhabited buildings, the distance specified by the byelaws locally in force), is not that there is not legal power to forbid such storage, but that local authorities are disinclined to put in force the powers which they possess, for fear of injuring trade or private interests.

6. The cartage of manure along the streets and public roads from the place of unloading to that of its use on the land is another frequent source of complaint. This is based partly upon the stench emitted from the uncovered contents of the carts as they pass along, but chiefly from the manure, owing to defective construction or careless loading of the carts, being allowed to drop on the highway, where it is permitted to

Cartage from wharf.

remain, and is ground up by the passing traffic, so that the road surface remains long polluted by it.

There is really no excuse for nuisance of this kind, which is due simply to the carelessness of carters, the parsimony and inconsiderateness of farmers, and the apathy of local authorities. For the removal a properly constructed cart should be used, and for material which is wet and sloppy, a watertight one. The cart should be carefully loaded, and, if the height of the load renders it necessary, should have boards round the sides to prevent any of the material falling off. Any that falls off should at once be swept up.

As a covering to prevent droppings and confine the stench, a good tarpaulin securely tied on is usually sufficient, except in the case of liquid matter.

Byelaws with the above objects may be made by any urban authority, or by any rural authority invested with the requisite urban powers. They may be made under two enactments, viz., Part II., section 44, Public Health Act, 1875, or section 26, Public Health Act (Amendment) Act, 1890. The former enactment applies to "filth, dust, ashes, and rubbish," the latter to "any fæcal or offensive or noxious matter or liquid."

Byelaws on the Board's Model, under section 44, Public Health Act, 1875, are in force in a large number of districts.*

The only point of which I have heard complaint as to their inadequacy is that the cart is required to be "furnished with a sufficient covering" so as to prevent the escape of the contents thereof, whereas it is held that the emission of stench should be also, as far as practicable, prevented. A similar limitation is also made in the Act of 1890. From a chemical point of view, no doubt, the giving off of effluvia is "the escape" of the contents, but it is doubted whether it would be so held in a court of law.

In populous districts it is often found desirable to limit the hours during which offensive matters may be carted through the streets in order to avoid the most frequented hours of the day. Byelaws for this purpose may be made under each of the above-mentioned clauses of the Acts of 1875 and 1890. On the other hand, removal during the night is open to the objection that the work cannot be efficiently superintended, and hence that there is risk of dropped matter being allowed to remain on the roads.

The hours usually sanctioned by the Local Government Board are 6 to 8.30 a.m. in the summer, from March to October inclusive, and 7 to 9.30 a.m. during the winter, from November to February inclusive.

[In the special case of Southend, however, where grave nuisance existed from unloading of manure on the foreshore, byelaws have been sanctioned restricting the unloading and carting of manure to the hours of from midnight to 8.30 a.m. throughout the year. The byelaws in question were made under a local Act of 1875, which empowered the Southend Local Board to make byelaws with respect to the landing and carting of manure for the comfort and convenience of the inhabitants. It was shown in this case that the landing could only be effected at certain states of the tide, and that the hours ordinarily fixed would not afford sufficient time for the work, and the Local Board undertook to arrange for the necessary supervision.]

7. Storage on the land, and
8. Application to the land.

Storage on land.
Application to
land.

* The Board have also sanctioned in a good many districts, byelaws under the Act of 1890, based on a model published by Messrs. Knight & Co.

An objectionable practice is common in country districts of piling manure in large heaps on waste ground by the roadsides, or in fields just within the gate, and close to the highway, to await distribution over the land. Though unpleasant to the passers-by, this practice is not generally much complained of unless the manure is of a specially offensive character, or is placed near to houses. The spreading of manure of an offensive nature over the land in the neighbourhood of houses may also occasion nuisance and be dangerous to health.

The means of preventing nuisances of this class are simple, viz., to deposit the manure at a sufficient distance from public thoroughfares and houses, or to cover it with a layer of earth; and, after spreading it on the land, to plough or dig it in without delay. Farmers, however, not themselves objecting to the smell of manure, are often unwilling to depart from their usual practice in deference to what they consider the fastidiousness of their neighbours.

The following byelaw of the Board's Model Series II., under section 44, Public Health Act, 1875, aims at the prevention of certain graver nuisances of this kind in urban districts:—

10. Every person who, for any purpose of agriculture, shall deposit or cause to be deposited upon any lands or premises within the distance of—(usually 100 yards)—from any street, or from any building or premises used wholly or partly for human habitation, or as a school, or as a place of public worship, or of public resort or public assembly, or from any building or premises in or on which any person may be employed in any manufacture, trade, or business, any filth which may have been removed from any cesspool, or any filth which may have been removed from any privy, or from any receptacle used in connexion with any privy, and which may not have been effectually deodorised, shall, with all reasonable despatch, cause such filth to be ploughed or dug into the ground or to be covered with a sufficient layer of earth, ashes, or other suitable substance, or shall adopt such other precautions as may be reasonably necessary to prevent the emission of noxious or offensive effluvia from such filth.

This byelaw only applies to human fœcal matter, and is therefore of no avail for the prevention of nuisances from London manure. If legal considerations permitted I think that it might reasonably and usefully be extended to include certain other specially offensive and dangerous classes of material, such as fish refuse, slaughter-house offal, and other dead animal matters. I understand, however, that such matters are excluded from this and the other byelaws of this series in view of the terms of section 44. This empowers an urban authority to “make byelaws for the prevention of nuisances arising from snow, filth, dust, ashes, and rubbish, and for the prevention of the keeping of animals on any premises so as to be injurious to health.” Dead animal matter has not been considered to be included in these words; as I learn from the legal department that the Board have taken the view that the word “filth” means fœcal matter, human or animal. Thus byelaws under this section, so far as they apply to London manure, do so in virtue of the comparatively inoffensive, and not of the most noxious, of its constituents.

The scope of the byelaws which may be made under section 26 (1) of the Public Health Acts Amendment Act, 1890, is wider in so far as it includes “any fœcal or offensive or noxious matter or liquid;” but the objects for which byelaws may be made are limited to (a) prescribing the times for the removal through the streets of such matter or liquid; (b) for providing that the vessel, &c. used for carrying them shall be properly constructed, and covered so as to prevent the escape of such matter or liquid; and (c) for compelling the cleansing of any place on which such matter or liquid may have been dropped during

removal. As these objects may all be provided for as regards "filth" in byelaws made under the earlier Act, the only point gained by making byelaws under the Act of 1890 seems to be the regulation of the carriage of such offensive matters, *e.g.*, dead animal matters, as are not legally included in the term "filth."

The Board usually recommend that stable manure should be exempted from the provisions of byelaws made under section 26 of the Act of 1890, on the ground that it is comparatively inoffensive. It should, however, be understood that the exemption only applies to horse-dung mixed with litter only. Much of the manure which is sent out from London and other large towns, while consisting in the main of horse-dung, contains also such offensive materials as fish refuse, slaughter-house garbage, and other putrid animal matter, and it is clear that such matters should not be exempted from the provisions of the byelaws even when mixed with horse-dung.

SUMMARY.

Summary.

1. The manure traffic, although lawful and necessary in the interests of both town and country districts, often occasions serious nuisances and sometimes injury to health.

2. The diseases which have been thought capable of being produced or conveyed by town manure are :—

1. General malaise, vomiting, diarrhœa.
2. Sore throat (follicular tonsillitis).
3. Diphtheria.
4. Enteric fever (when human excreta are contained in the manure, and especially when water sources are contaminated by it).
5. Other infective fevers.
6. Septicæmia, &c.

3. Although London manure is practically free from human excrement, yet much of it is of a very offensive character, largely due to its containing food refuse and waste animal matters, and to the length of time occupied in its transit.

4. The principal nuisances arising from the manure traffic in the districts to which it is consigned are caused by :—

- (a.) The unloading of trucks and barges in improper situations, as near houses or in frequented places.
- (b.) Deposit and storage of manure near houses.
- (c.) Careless carting, allowing effluvia to escape and the manure to drop on the highways.
- (d.) Careless disposal of manure on land near houses.

5. To a great extent these nuisances already are under the control of local authorities through the provisions of the Public Health Acts, or through byelaws which may be made thereunder; but in agricultural districts and small market towns there is often an indisposition on the part of local authorities to exercise the powers which they possess for their repression.

6. The directions in which further legal powers appear desirable are :—

- (a.) An extension of the scope of byelaws under section 44, Public Health Act, 1875, to include putrescible refuse matters other than fœcal.
- (b.) The power, if it do not already exist, to prohibit the unloading of manure in the immediate neighbourhood of inhabited buildings, either generally within a specified distance, or in any particular instance upon proof of nuisance.

EXTRACT

FROM THE ANNUAL REPORT OF THE

MEDICAL OFFICER

OF THE

LOCAL GOVERNMENT BOARD

For 1885.

DR. PARSONS has made inquiries during the year into the sanitary condition of the rag trade, in continuation of those upon which he reported in 1881. His recent investigations have been into the manufacture of shoddy, rag-flock, and similar substances from woollen and from mixed woollen and cotton rags, and into the influence of such businesses upon health. Like other dusty occupations, they are found provocative of a form of bronchial catarrh, and this affects some classes of workers so generally as to have received the name of "flock fever." And occasionally, small-pox or other infection is conveyed by the rags used in these manufactures, though not so frequently as by the cotton rags used in paper making. None of these diseases were heard of among the general public as resulting from the use of flock stuffing or other material manufactured from rags. Dr. Parsons describes the expedients adopted in certain factories for reducing the various risks to health incurred by the workers, and concludes his report by indicating the precautions which are generally available for the purpose.

GEORGE BUCHANAN.

August, 1886.

On the 1st of January 1890, the Local Government Board, in the exercise of its powers, has caused to be printed and distributed to the Local Authorities, a copy of the following Report, which is hereby published for general information.

LOCAL GOVERNMENT BOARD

West 1890.

The Local Government Board, in the exercise of its powers, has caused to be printed and distributed to the Local Authorities, a copy of the following Report, which is hereby published for general information.

REPORT OF THE LOCAL GOVERNMENT BOARD

1890.

The Local Government Board, in the exercise of its powers, has caused to be printed and distributed to the Local Authorities, a copy of the following Report, which is hereby published for general information.

On the Manufacture of Rag Flock in reference to the possible Dissemination of Infectious Disease by this and other Products of Woollen Rags; by H. F. Parsons, M.D.

On the Manufacture of Rag Flock, &c.; by Dr. Parsons.

THE manufacture of rag flock consists in the tearing up of rags into a fibrous material used for the stuffing of beds and articles of furniture. Rag flock.

The object of the present inquiry is to learn whether this manufacture involves any risk of infectious disease to persons engaged in it, or to those who use the manufactured article, and if so, how such risks may be obviated.

Any such risk, if it exist, depends upon the nature and antecedents of the rags which form the raw material of the manufacture, rather than upon the processes to which they are subjected in their conversion into flock. It will therefore be necessary to consider what these rags are, and where they come from. For the same reason:—viz., that danger of infection attaches to rags, *quâ* rags, rather than through the uses to which they are subsequently put,—it will be convenient to consider briefly at the same time from this point of view the other industries besides flock-making in which rags or their products are employed.

Cotton and linen rags are the province of the papermaker, and I need not here describe the processes of manufacture to which they are subjected, as I have already treated of these and the attendant dangers to the health of the workpeople in a report published as an appendix to the Annual Report of the Medical Officer of the Local Government Board for 1881.

In the present report I shall therefore treat of the risks of infection attaching to the use of woollen and partly-woollen rags in the various industries in which they are employed.*

Rags are imported into this country from almost every part of the world in which people are sufficiently civilized to wear clothing. I am informed, however, that at the present time the imports of foreign rags are comparatively small, as the low prices which they now fetch will not pay for freight. Those coming into the English market are principally from the Continent of Europe. They are imported in largest quantities at the ports of Goole, Hull, London, and Liverpool. Foreign rags ordinarily are compressed by hydraulic presses into hard and compact bales before shipment. Other rags are collected in this country, along with waste substances of other kinds, by people commonly called "marine store dealers," from whom they pass, through the hands of rag merchants and brokers, into those of the manufacturers. A very dirty class of rags is collected from the dust hills on which the refuse of London and other large towns is tipped. Rags of different primary classes, as cotton and woollen, are collected separately, and those of each class often undergo one or more sortings before they come into the hands of the manufacturers. The rag trade.

Paper mills are to be found in most parts of England, and the consumption of cotton rags is therefore distributed over the country. On the other hand, woollen rags are re-manufactured chiefly in the West Riding of Yorkshire, in the district around Dewsbury, at which town large sales of rags by auction take place twice a week; also in Gloucestershire and adjoining counties in the West of England, and in the neighbourhood of London.

* Silk rags do not appear to be utilised, except as manure.

On the Manufacture of Rag Flock, &c.; by J. Dr. Parsons.

Shoddy manufacture

Woollen rags go to the shoddy manufacturer, by whom they are torn up into an artificial wool, to be used again, with or without the addition of a proportion of new wool, for weaving into cloth, or into fabrics with a cotton warp, called "linseys." The rags are first dusted in a machine. The seams and linings, which contain cotton, are then removed by women who at the same time sort the rags into different qualities. They are then placed in a machine called a "rag-breaker" or "devil," in which they are passed between rollers and presented to a rapidly revolving drum set with numerous sharp iron teeth, by which they are torn up into fibre, a considerable amount of dust being set free at the same time, which is carried off by a fan and collected. The fibre is then "scribbled" in a machine in which it is repeatedly combed out by a series of wire-covered rollers, and is converted into a soft homogeneous wool, fit for the cloth manufacturer's use. Sometimes, but not always, the rags after being torn up are dyed; if not dyed, "pure" wool rags do not undergo any process of which it could be affirmed that it would with certainty destroy infectious matter, though it is probable that any such matter which they might contain, being attached to the surface as dirt, would be removed with the dust, or lose its activity by exposure to the air.

Wool extracting.

Rags of mixed wool and cotton, if containing sufficient wool to make it worth while, are subjected to a process called "carbonizing" for the purpose of extracting the wool. There are two ways of doing this. In the wet way the rags are steeped in sulphuric acid somewhat diluted, at a temperature of 160–190° F., then rinsed in water and dried in a stove. In the dry way the rags, spread out on racks, are heated for some hours in a stove in an atmosphere of hydrochloric acid gas, evolved by pouring sulphuric acid on common salt in an iron retort, or by heating the crude hydrochloric acid obtained as a by-product in alkali works. By one or other of these processes the cotton fibre is destroyed, being converted into a powdery matter, probably glucose, which flies off as dust when the rags are beaten, but the wool, being unaffected by the acid, remains, and undergoes further processes for conversion into shoddy. Either the wet or the dry process of wool-extracting would effectually destroy any infectious matter that might be present.

Manure.

Woollen rags are also used as manure, especially for hops; those rags which are too old, rotten, and dirty for shoddy making being used for this purpose, as is also the dust collected from the rag machines.

Flock making.

Flock making is carried on on the largest scale in the West Riding of Yorkshire, but there are mills also in Surrey, Gloucestershire, Lancashire, and other counties. The rags of which the commoner qualities of flock are made are the refuse of the shoddy trade, viz., what are called "heavy linseys," i.e., materials of mixed wool and cotton not containing enough wool to be worth extracting, such as "shallies" (i.e., old dresses), seams of woollen garments (ripped off by the sorters at the shoddy mills), and other articles of a character so miscellaneous as to defy description. Old carpets, consisting of wool on a backing of hemp or other vegetable fibre, are used for making a better kind of flock. The above materials may come from any part of the world, but principally, I was told, from England and France; but by the time they reach the flock manufacturers' hands they have commonly been so mixed and sorted that it is impossible to trace their origin. The rags from which flocks are made are often far from clean, but their character in this respect will depend upon the quality and price of the flock, which vary greatly. Thus at Mr. Robb's factory at Ossett Spa, a superior kind of flock, made of new wool from the

combings of blankets, curled, was sold at 1s. $\frac{1}{2}$ d. per lb. On the other hand the cheapest kind of flock made by Messrs. Sanderson, of Batley, was sold at 6s. 6d. per cwt.; this was made of rags of the coarsest and most dirty description.

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The process of manufacture is as follows: The rags on being taken out of the bale are carried by hand to the rag-grinding machine and placed on an endless band which carries them into the grip of fluted rollers, and the latter hold them to be torn by the teeth of a rapidly revolving cylinder, similar to that by which rags are torn into shoddy, except that the teeth are shorter and not so sharp,—in fact the cylinders of which the teeth are worn out for shoddy making are used for making flock. This machine is boxed in, and the dust is drawn out by a fan. The flock falls to the bottom, and is gathered in armfuls and packed in bags. Or in some cases the flock is shot through a flue by the current of air produced by the rapid revolution of the cylinder, into another machine, in which it undergoes a process of dusting. The amount of dust in unwashed rags is considerable, from 25 to 50 per cent. of the rags used, according to their quality; dirty rags of course give more dust than clean ones, and wool gives more than cotton. The dust is inflammable, and occasionally fires and explosions have been caused by the heat generated by the friction of the revolving cylinder, especially if rags have been put in hot. To avoid this danger the rags are sometimes damped by sprinkling water over them before tearing up. The dust is conveyed to a dust chamber and is collected from time to time and sent to the hop-growing districts for manure.

Process of manufacture.

The above description applies to the manufacture of rag flock as carried on in Yorkshire. In Gloucestershire a different process is in common use. The rags are first chopped by hand on a block. They are then pulped in a machine similar to that used in paper mills; this consists of an elliptical iron tank containing a revolving drum set with angular iron ribs, which works against a plate similarly armed. The rags, immersed in water, rotate in the tank, and are brought in turn under the drum, by which they are broken up. The process occupies an hour and a half; a stream of water running through the tank all the time. The flock is then dried, first in a centrifugal wringing machine, and then in a stove; and finally is curled in a machine with revolving blades.

Flock is also made in the Gloucestershire mills by the Yorkshire method, but the rags usually undergo a preliminary washing, passing under a paddle-wheel in a tank similar to that above described, and being afterwards dried. At the Wandsworth Flock Mills, Surrey, another washing process is in use, in addition to that last mentioned; the rags are placed under heavy wooden hammers, similar to the "stocks" used for fulling cloth, by which they are beaten for an hour under a stream of tepid water. This process, unlike the tank, does not require the rags to be first cut by hand: it is used for carpets; the tank process for flannel.

In Yorkshire the adoption of any process for the cleansing or purification of the rags before they are torn up appears to be exceptional, at any rate as regards the cheaper qualities of flock. The most frequent process appears to be washing, which is done when specially ordered. Messrs. Sanderson, of Batley, stated that washing with the subsequent drying would add 4s. per cwt. to the cost of the flock; they said that they had not had occasion to use their washing machine this year, and the appearance of the machine certainly bore out this statement.

Processes of purification.

Washing.

In the West of England, on the other hand, where water is plentiful, and a better class of flock is made, a large proportion of the flock is washed; at some mills, as those of the several Messrs. Grist, near Stroud, none

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but washed flocks are made. Some of the West of England manufacturers, however, have felt themselves, as they say, reluctantly compelled in these days of low prices and keen competition to manufacture unwashed flocks, in order to hold their ground against the Yorkshire makers.

At the factories where the cheapest qualities of flocks are made some of the rags were seen to be very dirty, and all were ground up together. At some factories, however, exceptionally filthy rags are rejected. Rags are sometimes met with which are soiled with blood or excrement, but I did not hear of poultices being observed, or anything which would lead to the inference that the rags had been used by sick persons. Such things would be more likely to be met with among calico than linsey rags. The rags are often infested with fleas and moths, but other vermin are said not to be often met with.

Washed flock is said to be less liable to be damaged by moths than that which contains the dirt.

Chemical
solutions.

Two Yorkshire manufacturers, Messrs. Robb, of Ossett, and Illingworth, of Batley, use in the case of inferior flocks a solution of a permanganate for damping the rags before tearing up. This is cheap, and would help to remove any offensive odour that might be present, but is not likely in the quantity used to have much effect in the way of disinfection properly so called.

Illingworth's
patent
disinfectant.

Mr. Illingworth has also patented a machine for the disinfection of rags for flock making by heat and sulphurous acid gas. His machine consists of an iron cylinder with a door at one end, and with double walls forming a steam-jacket. Inside this cylinder is a revolving cylindrical cage with prongs which catch the rags and lifting them turn them over and over. A charge of rags is from 1 to $1\frac{1}{2}$ cwt. At one end of the machine is a small iron furnace with a flue communicating with the interior of the chamber ; in this furnace 4 ozs. of sulphur are burnt with each charge of rags. Each charge remains in the machine 35 minutes. The steam in the jacket stands at 70 lbs. pressure : $=316^{\circ}\text{F.}$, but steam does not enter the interior of the chamber.

Experiments
therewith.

In order to test the action of the machine a registering thermometer was embedded in a groove in a long wooden bar with perforations opposite the bulb. This arrangement was necessary to prevent the thermometer being broken, or its index displaced, by the motion of the cylinder. A piece of iodide of starch paper was wrapped up in a rag, and both it and the thermometer in the bar were placed in the machine in the middle of a charge of rags and allowed to remain 40 minutes ; the cage, turned by an engine, revolving all the time. At the end of the period a thermometer on the bottom in the space between the cage and the steam-jacket registered 273°F. , but that in the bar only 169°F. The iodide of starch paper was bleached by the sulphurous acid gas except in the folds, where it retained its colour. In other experiments, after 50 minutes, the thermometer in the bar reached 177°F. , and after $1\frac{1}{2}$ hour, 217°F.

In my report on Disinfection by Heat (Annual Report of the Medical Officer of the Local Government Board, 1884), are recorded experiments tending to show that the penetration of heat into textile materials exposed to hot air is greatly aided by moistening the air. At my suggestion, in view of these experiments, Mr. Illingworth had a $\frac{3}{4}$ -inch steam pipe connected with his machine so that a jet of steam could be admitted into the interior, at the same time omitting the sulphur vapour. The result was that, although the steam pressure in the steam-jacket fell to 65 lbs. : $=312^{\circ}\text{F.}$, at the end of 35 minutes the thermometer in the bar recorded a temperature of 216°F. ; so that when steam was used a temperature which can be considered sufficient for disinfection was

attained in little more than a third of the time necessary with dry heat. The rags, after being removed from the chamber and allowed to cool, were not appreciably damp; indeed Mr. Illingworth finds that rags lose weight in the chamber even when steam is used.

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Mr. Illingworth has invented another machine for disinfecting rags in the bale, but I regret that it was not in use at the time of my visit. It is a steam-jacketed chamber, but the special principle is that he displaces the cold air from the interstices of the bale by exhausting the chamber with an air-pump, and allows its place to be taken by chlorine or sulphurous acid gas let in by opening a valve.

Cheap as the inferior qualities of flock are, they are yet liable to be adulterated. The fibrous dust shaken out of woollen materials, as stockings, by the shoddy manufacturers is used for this purpose. The residue of the oily waste from the clothweavers, after the oil has been as far as possible recovered by hot pressing, is sometimes used to mix with flock, but this practice is scarcely considered by the trade as legitimate, and one manufacturer, not very particular about cleanliness, told me that he had given it up, as he found that the greasiness and bad smell which it gave to the flock caused much dissatisfaction among his customers. Still this oily waste is not likely to convey infection.

Adulterations of
flock.

At one factory I saw an iron tank containing liquid with a thick black putrid scum, like that which collects on the surface of a sewage tank, but more fibrous. I was told that the contents of this tank were the refuse and sweepings of the yard and workshops, and that once in six months or so they were washed and dried in a stove, and then were considered to make good flock, being sold at more than twice the price of the lowest quality.

As regards the possibility of the transmission of infectious diseases by flock made from infected rags, I have made inquiries of a number of medical officers of health in the rag-working district of the West Riding of Yorkshire and elsewhere, and of flock manufacturers, rag merchants, and upholsterers; also, in respect of the dust, of medical officers of health and manure merchants in the hop-growing counties. The result of these inquiries has been to show that while workpeople engaged in the manufacture of flock suffer from certain symptoms produced by the irritation of inhaled dust, instances in which infectious disease had been contracted by them were scarcely to be met with. Indeed, many medical officers and manufacturers of large experience had never known any instance of an outbreak of infectious disease which could be attributed to rag-infection. A few cases were heard of in which persons who had been handling woollen rags for shoddy making had contracted small-pox or other infectious disorder, but the only case at a flock factory was attributed, not to infected rags, but to the re-making of a flock bed on which a small-pox patient had died.

Possibility of
transmission of
infection.

In a report already mentioned, made in 1881, I quoted a number of outbreaks of small-pox among rag-sorters at paper mills; and since that date a good many others have been reported, some of them being at mills at which previous outbreaks were recorded in my report, some at other mills in different parts of the country. There is a common belief that woollen articles are more apt to retain infection than cotton or linen ones; but, so far as my inquiries go, workers among woollen or partly-woollen rags are exposed to less danger of infection than workers among calico rags. The explanation I believe to be that the latter consist largely of articles which come into close contact with the body such as underclothing and sheets, and are therefore more likely to be

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Experience of flock makers.

infected by a sick person, at any rate by one lying in bed, than woollen articles are. In corroboration of this view it is to be noted that the paper mills at which outbreaks of small-pox have occurred have been with few exceptions mills at which the best class of writing papers, made from white rags, are manufactured; sorters of coloured rags being seldom attacked. Probably also woollen rags undergo less handling than the rags at a paper mill do, as those for the best writing papers are cut up small by hand.*

The following are the instances of which I have been able to hear, in which infectious disease has been suspected to have been contracted from woollen rags or flock:—

Mr. Thomas Robb, flock manufacturer, Spa Mill, Ossett, Yorkshire, says:—

“My old workman, who says that it is over 17 years since he left me, says that the following case occurred before he left:—

“A bed was sent to my place to be re-dressed, but he refused to do it, or allow it to be unloaded from the dray at all. He stated then (and repeated last week) that a bed had been sent about a month before to Etchell's flock factory at Horbury to be re-dressed; the man, named Smith, who fed the machine, took small-pox and died. His fellow-workman, who ‘shook’ it, was also taken ill of the same disease, but recovered. It was afterwards ascertained that the bed sent to Etchell's had been lain on by a person who died of small-pox. He says that the bed, although a flock one, was not a rag-flock bed. I have been 21 years in the trade here, and the above is the only instance I have known, or rather heard of, of a workman having caught an infectious disease from the material he was using.

“Etchell and Co. failed and left Horbury about six or eight years ago.

“I have always refused to re-dress a bed since.”

I made further inquiries at Horbury and neighbourhood, but could not learn anything more of this case.

Among other workers in woollen rags.

Mr. Butterfield, then medical officer of health for Bradford, Yorks, in his annual report for 1879, mentions the case of an unvaccinated girl aged 15 who was taken ill with small-pox. There had been no case in the borough for many months, and the patient had not left the neighbourhood of her home. On inquiry, it was found that she had been temporarily employed at a wool-extracting establishment sorting rags, a large proportion of which had come from London, where small-pox had been very prevalent. In a few days another young woman employed on the same work exhibited symptoms of the disease. A few more cases, difficult to trace, but probably springing from the same source, occurred.

Mr. Greenwood, medical officer of health, Ossett, states that in 1880 a young woman working as rag-sorter at a rag warehouse in Ossett was taken ill of small-pox. She had been working on “skirtings”—mixed cotton and wool for “extracting.” She lodged at a mangle-house, and the case was at first concealed and proved the starting-point of a local epidemic, the district having been previously free.

Mr. Greenwood has met with other cases, produced apparently in a similar manner, but not recently. He also stated that people who work

* The explanation of the fact, if fact it be, that outbreaks of infectious disease are more frequent among workers in cotton and linen than among workers in woollen rags, does not seem to be that there are more rags of the former class in circulation. In the five years 1880–84, the amount of woollen rags imported into the United Kingdom was 180,851 tons; of other rags, 142,391.

among rags are liable to contract itch. (Tardieu, *Dictionnaire d'Hygiène Art. Chiffonniers*, makes a similar statement.)

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Mr. Francis Wood, medical officer of health, Wakefield rural district, has met with several cases of small-pox originating among ragsorters, but more at paper mills than among sorters of woollen rags. In a case occurring in June 1881, the patient, who resided in the district of the Sandal Magna Local Board, had been working up to the time of her illness in sorting rags at a shoddy mill in Wakefield.

In April 1885 he reports that a woman living at East Ardsley was attacked with small-pox. She had been working at a rag mill in the neighbourhood; but she had visited at Leeds, in the neighbourhood of which town there had been cases of small-pox. The rags which she had been working at were "shallies," i.e., old dresses (women's) from London; they were for carbonizing to extract the wool, not for flock making.

Dr. Wade, medical officer of health for the borough of Wakefield, also states that all the cases of small-pox which have occurred in that borough during recent years have had their origin among workers in rag factories; but he was unable to give further particulars.

Dr. Goldie, medical officer of health for Leeds, has sent me a report on some cases of small-pox which occurred among ragsorters in that borough in 1878. Of these cases, 1 and 2, girls living in adjoining streets, and working in the same mills, and at the same rags, were taken ill, the one on April 1st, the other about four days later. Case 3, sister of case 1, living and sleeping with her sister, and also working at the same bench with her in the mill, was taken ill on April 11th. (The dates seem to show that it is at least as probable that she took the disease directly from her sister as that she was infected by the rags on which they had both worked.) Two other cases of small-pox subsequently arose through personal communication with the above. There had been no previous cases in that part of the borough. The suspected rags, and all likely to have been in contact with them, were at once disinfected by chemical means and dry heat; their previous history was not ascertained.

Mr. Steele, late medical officer of health, Morley, says in letters:—

"I only remember one case of infectious fever presumably due to infected rags. This was a lad in the year 1880, who died of typhus fever. He was a ragsorter, and at the same time some cases of typhus had occurred in Leeds which were supposed to have been due to infected rags. No other case occurred either amongst the other men who worked with the deceased or amongst his own family. Typhus fever is practically unknown in this district, and the lad was not at all in destitute circumstances. I do not know where the rags came from; they were woollen rags used in the manufacture of cloth."

Mr. Partridge, medical officer of health for Stroud and adjoining districts, says:—

"I have not met with any cases of small-pox in the Bisley district, which includes the shoddy mills in Chalford and Brimscombe, since 1875. At that time we had several arising from the effects of opening bales of infected rags, as the women complained of a sickening smell at the time, and were taken ill with a severe form of the disease."

In 1871 an outbreak of small-pox occurred among ragsorters at the Toadmore mills, near Stroud. In that year it will be remembered there was a widespread epidemic of the disease in this and other countries, and infected rags were therefore likely to be in circulation; but it is said that there had been no previous cases in the neighbourhood of Stroud. The particulars, as given me by the mother of one of the patients and

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the sister of another—the statements of the two women agreeing together—are as follows: In one room four women were at work sorting rags; they worked at two bags, two women at each bag. Of the four, three were taken with small-pox, C. (æ. 15), and D. (æ. 16), who worked at one bag, on the same day; B., a young married woman, who worked next them at the other bag, a day or two later. The other woman escaped, as did also the sorters in another room. The rags on which those who took small-pox were working were “shallies,” *i.e.*, old dresses, of mixed wool and cotton, for carbonizing; but it was not known whence they came. C. and D. died, and a baby five weeks old, in C.’s family, was taken with small-pox a fortnight after her, and died. Mrs. B. recovered, but her husband took the disease and died.

The “woolsorters’ disease” which occurs in Bradford and neighbourhood among men engaged in handling the fleeces of animals which have died of anthrax has been described by Mr. Spear in the Annual Report of the Medical Officer of the Local Government Board for 1880.

Of upholsterers.

I have not been able to hear of any cases of infectious disease among upholsterers, or the public their customers, traceable to the use of infected rag flock. Doubtless the risk of infection to which these classes are exposed is much less even than that of the flock manufacturers, both because any infectious matter which the rags may have contained has in large part been got rid of in the form of dust, and also because any that may remain will be older and thus likely to have had its activity diminished or lost. Cases, however, of infectious disease among the general public from the use of infected flock, if such occurred, would probably be very difficult to trace and are not likely to be recorded.

I learn that large upholsterers and firms of repute use, as a rule, wool or flock made of new or washed material, and that the coarser qualities are chiefly used by small and obscure tradesmen, among whom also the still more objectionable practice is sometimes adopted of using the flock out of old beds and furniture for the stuffing of new. The cheapest sort of flock is said to be used for stuffing mattresses for emigrant ships, being thrown overboard at the end of the voyage.

The greater part of the materials used by upholsterers of repute for stuffing beds and furniture are not likely to be infected. Feathers are purified by steam heat. Horsehair, besides being purified by washing, is curled at a very high temperature, about 300° F. “Millpuff” is the woolly waste beaten out in the process of fulling which cloth undergoes in the course of manufacture.* Cotton flock, a cheap material largely used, is the refuse of raw cotton. Other materials of a vegetable nature are straw, chaff, cocoa-nut fibre, a kind of coarse wiry grass resembling the mat-grass of our sandy coasts, and a kind of seaweed (apparently a *Zostera*), said to be imported from Russia, and called in the trade “ulva.” Such materials, unless taken out of old furniture, have not previously been used. The better classes of flocks are made of new or comparatively clean material, so that it is only the inferior classes which are at all likely to be infected.

The dust which flock retains as received from the manufacturers is further removed by a process of beating and carding at the hands of the upholsterer before the flock is used for stuffing.

* The short flock used by paper-stainers in the manufacture of flock wall-papers consists of the superfluous “nap” from the surface of cloth, sheared off in the process of manufacture.

The following instances are all those which I have been able to hear of in which disease has been attributed to the handling of infected waste used for manure :—

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Dr. Robinson, medical officer of health for East Kent, writes :—

"I have a record made on April 29, 1877, of four cases of blood-poisoning derived apparently from infected wool waste (I believe shoddy). They occurred at separate cottages some distance from each other, but the sufferers had all been at work engaged in carrying wool waste. One man whom I saw had erysipelatous inflammation on the hands and at the back of one ear, and was much prostrated. He informed me that on account of the land being heavy it was difficult to distribute the manure by cart and shovel, and in consequence the manure was carried in a basket and cast on the land by hand in the same way as wheat is hand sown. Further, he told me that he had a habit of scratching the back of the ear, the spot which had evidently been inoculated.

"The other three men suffered from sickness, diarrhœa, and febrile disturbance. The symptoms were obscure, but more like septic poisoning than anthrax. No fatal case occurred, but one of the latter three men was very ill, viz., the one who carted the wool waste from the station.

"I do not remember any cases of small-pox arising from infected wool waste. In some other instances of illness occurring among persons who attributed their attacks to poisonous wool waste the evidence on the subject was not very clear."

Dr. E. F. Fussell, medical officer of health for East Sussex, mentions a case in which a lad who had for a week or more been employed in spreading with his hands "fur waste" manure over a field, was taken ill of scarlet fever which was attributed to infection in the manure, as there had been no previous cases in the neighbourhood, and the lad had been nowhere away from home except to his work. The "fur waste" is described as the refuse of fur and felt manufactories; it would not appear *a priori* to be a material very likely to be infected, and it hardly comes within the scope of this report.

Workers in flock factories, on commencing to work among the dust, suffer from a malady known among them as "flock fever." Mr. Illingworth, a large manufacturer, says that he has never known anyone escape it. The symptoms are described as those of a severe catarrh of the bronchial passages, viz., shivering, difficulty of breathing, cough, soreness of the chest, and expectoration of mucus charged with dust. In about a week's time, if the man continues at work, a tolerance of dust is established, the symptoms subside, and do not recur so long as he keeps at the same work: but on leaving it off the tolerance for dust is soon lost, and on returning, after a week or two's absence, a man suffers again as at first. I am even told that the men will not empty the dust-chamber on a Monday, as they would suffer more from the dust then than if they had been at work the day before.

Noxious effects of inhaling dust.

Men who can eat well are said to be comparatively little affected by the dust, but those whose appetite fails are apt to break down. Heavy drinkers, on the other hand, cannot stand the dust well, and men are said to cough much at their work if they have been drunk the night before. A "cold," with catarrh of the air-passages, also causes the irritative effects of the dust to be felt.

When men have got used to the dust the work is not considered unhealthy. Among some 25 men constantly employed by him about the rag machines, Mr. Illingworth says that only one has died in the

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past 12 years; he was a man who drank heavily, and the dust used to punish him much. He had a bad cough and died of inflammation of the lungs.

This so-called "flock fever" does not appear to come under medical observation, but is treated by domestic remedies, as for a common cold. In fact the only way is to continue at work, for if the sufferer gives up he has to go through it all again before he can get inured to the dust. The condition of the workshops has been much improved of late years through the operation of the Factory Acts by boxing in the rag machines and drawing off the dust by fans; and the men are said to suffer much less from dust than they formerly did. If the rags have been washed before tearing up, much less dust is evolved, and what there is is less irritating than that from dirty rags.*

Upholsterers' men, when working among flock, are said also to suffer in some degree from the effects of inhaling a dusty atmosphere.

Suggested precautions.

As regards the precautionary measures which may be taken against the spread of infectious diseases by rag flock, I find that three classes of measures may be recommended; the first two being specially for the protection of the work-people; the third for that also of the public at large:—

Vaccination.

A. *Vaccination*.—Against small-pox, which is the disease most likely to be propagated by infection contained in rags, vaccination, with re-vaccination on arriving at adult age, is, when properly performed, a very efficient, if it be not an absolutely certain, prophylactic; and rag merchants and manufacturers should make it a condition of their service that every rag worker should have been efficiently vaccinated and re-vaccinated.

Avoidance of dust.

B. *Avoidance of Dust*.—Much has been done in this direction, and it would seem with beneficial results as regards the general health of the workpeople. Any further steps in the same direction that may be practicable should be taken. The general cleanliness and ventilation of the premises should be looked after, and facilities afforded for habits of personal cleanliness on the part of the workpeople.

C. *Cleansing and Disinfecting of Rags*.

Cleansing

(a.) Washing of the rags, thoroughly performed, as by one of the processes already described, would in all probability remove any infectious matter adhering to the rags. It is not, however, any protection to the work-people. On the contrary, the additional handling required in the early stages would tend in the opposite direction. The principal danger appears to be in the first opening of the bales, and therefore any measures of disinfection, to be effective, must be applied to the rags while still in the bales.

and disinfection of rags.

(b.) Chemical disinfectants, as permanganate of potash, sulphurous acid, or chlorine gas, may be of use as deodorants and for destroying vermin with which the rags may be infested, but the result of recent experiments has been to show that the efficacy of such agents for the destruction of morbid poisons has been greatly overrated, and that they cannot be depended upon for that purpose unless they are in a comparatively high degree of concentration, and allowed to act for a considerable period, in which case they may injure the fabrics to be disinfected. Their disinfecting power is, however, increased at high temperatures.

(c.) On the other hand it has been shown that heat, especially moist heat, readily destroys the activity of morbid poisons. In my report on

* This advantage, it may be remarked, is gained at the cost of a certain amount of river pollution; the streams carrying off the organic matter, which would otherwise find its way to the land as manure.

Disinfection by Heat, before quoted, it is shown that the spores of the bacillus anthracis (the minute parasitic organism which produces wool-sorter's disease), one of the most refractory of known infective materials, were destroyed by an exposure of five minutes to 212° F. in steam or boiling water; and by one of four hours to 220° F., or of one hour to 245° F. in hot air, dry or moist, while infective organisms devoid of spores were destroyed by one hour's exposure to 220° F., in air. Steam was found to penetrate into badly-conducting materials, such as bales of rags, much more rapidly than hot air; in the case of hot air the penetration of heat was found to be aided by moistening it. Moist heat is the best agent for disinfecting rags, since it will penetrate them in the bale and thus avoid the necessity for unpacking and the consequent handling of the undisinfected rags, and the most effectual way of applying heat with moisture is in the form of what is called "dry" or superheated steam. In Lyon's patent steam disinfector a temperature of 206° F. was attained in the centre of a press-packed bale of rags weighing 5 cwt. in three hours, and one of 252° F. in four hours. In the latter experiment the increase of weight of the bale due to moisture condensed from the steam was only four per cent. It is stated that in an American apparatus in which superheated steam is injected into the centre of the bale through hollow screws, effective disinfection can be carried out in considerably shorter time even than that mentioned above.* Of Mr. Illingworth's machines for disinfecting rags I have spoken in an earlier part of this report, and I have no doubt that loose rags can be effectually disinfected in the one that I saw in action. Whether a press-packed bale could be heated through in a reasonable time I do not know.

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In my report on rag infection in the paper trade it was shown that, desirable as it might be for the safety of the workpeople, that all rags should be disinfected before being sorted, it was difficult to recommend that such disinfection should be made compulsory, for the following reasons:—

Ought disinfection of rags for flock making to be compulsory?

The law already forbids under penalty the selling, transmission, or exposure of infected articles, so that if infected rags pass into the market, it is through a breach of the law on the part of the original vendor, and it would hardly be just to require manufacturers to guard against such a possible breach on the part of other persons by disinfecting all rags which passed through their hands; while in the absence of any character by which infected rags could be recognised—and there is no such character,—it would be impossible to discriminate between the few cases in which disinfection was required and the many in which it might safely be omitted.

These considerations apply also to the case of rags used for flock making, but there are some differences in the two cases.

(a.) In the case of paper making, the question is only that of danger to those who sort the rags, and not to the public who buy and use the paper, for the rags after sorting undergo processes by which any contagium which they may contain is certain to be destroyed. Flock, on the other hand, does not necessarily undergo any process of purification beyond the removal of the dust before coming into the hands of the public.

* I am informed by Messrs. Cohen & Co., rag merchants, of Great Dover Street, London, who send many rags to the United States of America, in which country the importation of undisinfected rags is prohibited, that they prefer to expose the rags, hung on racks, to the fumes of burning sulphur before shipment, rather than allow them to be subjected by the American authorities to the steam process above mentioned, which is considered by manufacturers to injure the rags. This injury, if real, is likely to be the result of the very high temperature (330° F.) of the steam employed; a temperature quite unnecessary, judging by the results of the experiments to which I have referred above. [See Appended Note, page 15.]

On the Manufacture of Rag Flock, &c.; by Dr. Parsons.

(b.) In the case of paper-making, any preliminary disinfection of the rags would not improve the quality of the finished paper; it is even feared by paper-makers that the paper would be injured thereby. In the case of flock, a disinfected article would presumably be worth more, certainly it would not be worth less, than a crude one. Disinfection would at all events destroy any insects, such as moths.

(c.) On the other hand, there appears to be more danger of infection connected with the rags used in paper-making than with those from which flock is made. Possibly, however, the result of attention being called to the subject may be to show that instances of infection being conveyed by woollen rags are not so rare as at present appears.

Thus, in the case of flock making, the manufacturer does not obtain in the manufactured article the same degree of security against the operation of infection contained in the original rags as is obtained by the paper maker; and though it may not be practicable to enforce upon the flock maker a general disinfection of all rags used in his business, yet there must be a variety of means by which he can reduce the danger of infection being conveyed with his rags. To that end, it is to be desired that the attention of manufacturers, upholsterers, and the public should be drawn to the risk of such infection, and to the advantage of a preliminary disinfection of materials.

The advantage of a washed flock over one "in the dirt," as it is called, is already recognised in the trade; only, it is alleged, many of the public will not pay the necessary price for the better and safer article.

RECAPITULATION.

Recapitulation.

1. Rag flock is a material used for stuffing articles of bedding and furniture.

It is made by tearing up rags, usually of mixed cotton and woollen nature.

The rags from which the inferior qualities of flock are made are commonly very dirty, and do not, as a rule, undergo any process of purification beyond the removal of the dust.

2. Flock makers and others exposed to rag dust suffer, especially at first, from symptoms produced by the inhalation of dust. They do not, however, appear often to contract infectious disease.

A few cases were heard of in which persons working among woollen rags, or handling rag dust used as manure, had contracted small-pox or other infectious disease, possibly from infectious matter contained therein.

No cases of infectious disease, attributed to the use of infected rag flock, were heard of among upholsterers or the general public.

Workers among woollen rags appear to incur less danger than cutters of cotton and linen rags at paper mills, probably owing to the fact that woollen rags consist mainly of articles which do not come into close contact with the body.

3. The following precautionary measures are available:—

A. Vaccination and re-vaccination of rag workers.

B. Ventilation, cleanliness, and avoidance of dust in rag factories.

C. Disinfection or purification of rags; preferably in the bale.

The best disinfectant for the purpose is heat in the form of superheated steam, or hot moist air.

In conclusion, I have to express my obligations to the various medical officers of health, manufacturers, and others who have kindly furnished me with information for the purpose of this report.

APPENDIX.

SINCE writing this report, I have received from Dr. W. M. Smith, health officer of the port of New York, a letter in answer to my inquiries as to the method of steam disinfection in use at that port, referred to on page 13 of this report.

On the Manufacture of Rag Flock, &c.; by Dr. Parsons.

Dr. Smith says:—

"I can only give you the desired information approximately in relation to the cost of apparatus for disinfecting baled rags, as practised at this port.

"I estimate the prime cost of the apparatus at \$10,000.

"The working cost will depend on the relative wages paid in England and in this country. It requires here one engineer, one fireman, and two labourers. I have always required that a superintendent should also be employed, accountable to me for the faithful supervision of the duties, making five employes for one disinfecting box or set of hollow screws; for every other box or set of screws two additional men. The plant used at this port has four boxes (or four sets of screws). It has not been often that four sets of screws have been used at the same time. Four men would be sufficient for one box, as the engineer could supervise the disinfection if he was not employed by the disinfecting company.

"The time required to produce in all parts of the bale a disinfecting heat is eight to ten minutes. Of course the number of bales disinfected per diem depends on the number of sets of screws used.

"The charge made by the company has been \$5 per ton, or 4-cent per pound. I have no doubt that they could be disinfected for half this price at a profit, if there was enough to do to keep the plant busy a considerable part of the time. I have considered it my duty to allow rags to enter the port to be distributed if disinfected, before they were shipped, by the process adopted by the Treasury Department of this Government, to wit, by exposure to sulphurous acid gas, with the rags well scattered on racks. The result has been that a large proportion of the rags have been disinfected before they arrived at this port, and the plant for disinfecting by superheated steam has proportionately languished.

"Any and all such disinfection of rags attended with cost will be objected to by the owners. It is difficult to say, therefore, whether the complaints that have been made of the injury to rags are true. There is no doubt that by neglect or inattention of the operators rags may be scorched, but there is no need of this if the steam in the superheater is maintained at the proper standard, say 400° F., as there will be a loss of 80°—100° F. in the transmission from the superheater to the supply heater from which the steam is thrown into the bale through the hollow screws. It is easy then to ascertain, by the introduction of thermometers under the covers of the bales, how many minutes will be necessary to secure a disinfecting heat. All bales, then, of about the same weight it may be safely assumed will be disinfected by the same degree of heat at the supply heater, and the same length of exposure.

"The scorching, or the danger of it, may be prevented by the attachment of a connexion with moist steam. The introduction of this first for three or four minutes, followed by superheated steam for four or five minutes will obviate any scorching, while it will contribute to the efficiency of the disinfection. The condensation of steam is infinitesimally small. Experiments made show an appreciable increase in the weight of a bale of rags after disinfection by superheated steam, but on opening such bales, as has often been done, no appreciable moisture is found.

"A report has been made to me by an expert rag inspector of an examination of numerous bales of rags disinfected by superheated steam, which declares that the market value of rags is not affected by such disinfection.

On the Manufacture of Rag Flock, &c.; by Dr. Parsons.

"I strongly suspect that the less cost of disinfecting by 'sulphurous acid gas with rags well scattered upon racks,' is a greater objection than any damage to the rags when disinfected by steam, as I understand that it is done in various parts of Europe for 60 to 75 cents per ton. I am not well satisfied that it is done efficiently in all cases. In fact the recent development of small-pox at the Holyoke mills in this country is said to have come from imported rags marked 'disinfected' on the bale. As no rags are so marked when they are disinfected here, and as they are so marked by some of the inspectors of disinfection in Europe, I infer that the rags were inefficiently disinfected before shipment."

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M.C.





