

Condemned meat : report to the Sanitary Committee of the Honourable the Commissioners of Sewers of the City of London, upon various methods of dealing with meat seized as unfit for human food in the City of London / by W. Sedgwick Saunders.

Contributors

Saunders, W. Sedgwick 1824-1901.
City of London (England). Commissioners of Sewers.
Royal College of Surgeons of England

Publication/Creation

London : Charles Skipper & East, printers, 1877.

Persistent URL

<https://wellcomecollection.org/works/vqh73376>

Provider

Royal College of Surgeons

License and attribution

This material has been provided by This material has been provided by The Royal College of Surgeons of England. The original may be consulted at The Royal College of Surgeons of England. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



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

CONDEMNED MEAT.

REPORT

TO THE

SANITARY COMMITTEE

OF THE

HONOURABLE THE COMMISSIONERS OF SEWERS
OF THE CITY OF LONDON,

UPON

VARIOUS METHODS OF DEALING WITH
MEAT SEIZED AS UNFIT FOR HUMAN
FOOD IN THE CITY OF LONDON.

BY

W. SEDGWICK SAUNDERS, M.D., F.S.A.,

MEDICAL OFFICER OF HEALTH AND PUBLIC ANALYST FOR THE
CITY OF LONDON,

LATE PRESIDENT OF THE HUNTERIAN SOCIETY, &c., &c.

LONDON:

CHARLES SKIPPER & EAST, PRINTERS, ST. DUNSTON'S HILL, E.C.

1877.



CONTAINED HEREIN

RECORD

IN THE CITY OF NEW YORK

IN SENATE

THE SENATE OF THE STATE OF NEW YORK
JANUARY 18, 1891

REPORT OF THE
COMMISSIONER OF THE LAND OFFICE
IN RESPONSE TO A RESOLUTION PASSED BY THE SENATE
JANUARY 18, 1891

ALBANY

WHEAT, HARRIS & COMPANY, PRINTERS

*At a Meeting of the Commissioners of
Sewers of the City of London, held at
the Guildhall of the said City, on
Tuesday, the 11th day of September,
1877,*

WHINFIELD HORA, ESQ., DEP., IN THE CHAIR.

A Report from the SANITARY COMMITTEE (EDWARD EYRE ASHBY, Esq., Deputy-Chairman), dated this day, was read—

On the subject of disposing of the Meat, &c., condemned in the City of London as unfit for human food, and recommending that the Report of the Medical Officer of Health thereupon be printed and circulated as usual.

RESOLVED—

That the Report of the Committee, together with the Report of the Medical Officer of Health and the conditions upon which it is recommended that Tenders should be made, be printed and circulated amongst the Commissioners, and the further consideration be adjourned until the next Meeting of the Commissioners.

HENRY BLAKE,
Principal Clerk.

At a Meeting of the Commission
Held at the City of London, 18th
the 18th of the month of June
1877

WHITFIELD HOLL, Esq., Secy, in the Chair.

A Report from the Secretary, Comptroller (Lawrence)
John Albert Esq. (Secretary-General), dated the
18th June 1877.

On the subject of the Report of the Medical Officer
submitted in the City of London as to the health
and condition of the City of London, the Report of the
Medical Officer of Health, the Report of the
Medical Officer of Health, the Report of the
Medical Officer of Health.

That the Report of the Comptroller, together
with the Report of the Medical Officer of Health,
and the Report of the Secretary, be printed and
that the Report of the Comptroller, and the Report
of the Medical Officer of Health, be printed and
that the Report of the Comptroller, and the Report
of the Medical Officer of Health, be printed and
that the Report of the Comptroller, and the Report
of the Medical Officer of Health, be printed and

HENRY BLAKE,
Secretary.

TO THE SANITARY COMMITTEE OF THE HONOUR-
ABLE THE COMMISSIONERS OF SEWERS.

GENTLEMEN,

Agreeably to your instructions that I should report generally upon the method of dealing with the meat seized by the Inspectors, as unfit for human food, in the several markets in the City of London, and also upon the arrangements by which the said meat is conveyed to the Foreign Cattle Market at Deptford, including a description of the appliances by which it is there destroyed, or utilized—under the directions and authority of the Cattle Markets Committee of the Corporation—I have the honour to submit the following observations :—

I may premise, that the latter part of the question has been pressed upon your notice by an intimation from the Markets Sub-Committee, to the effect that the enormous increase of legitimate business at the Deptford Market renders it difficult for them to continue the agreement, entered into between themselves

and the Honourable the Commissioners of Sewers in September, 1872, and existing up to the present time, by which they undertook to take the meat and provide for all charges of transit, and labour, and machinery, and pay over to the Commissioners of Sewers *one-third* of the sum realized by the sale of the produce after passing through the "Extractor": a conclusion which imposes upon the Commissioners the responsibility of providing some other means of getting rid of the same.

A comprehensive consideration of the subject in its entirety involves several distinct propositions.

1st.—The mode of dealing with diseased and putrid meat when first seized by the Inspectors.

2nd.—The best means of conveying it to the place at which it is to be destroyed or otherwise treated.

3rd.—The place at which it is to be deposited.

4th.—The most economical and efficient process for its utilization or destruction.

5th.—*The commercial value of the three principal constituents of meat as seized in the market, viz., flesh, fat, and bone, in their raw state, for purposes in the Arts and manufactures only, estimated at current prices.*

6th.—*The application of the products of the said meat after its complete reduction into fibre, bone, and fat, by mechanical or chemical processes, based upon the known worth of the contained ammonia, phosphorus, and fat, the two former as fertilizers, the latter for use in the Arts, as calculated from scientific data.*

The **first proposition** may be sub-divided into two heads:—

(a) The deodorizing of all diseased or putrid meat immediately after it has been seized by the Inspectors.

(b) The substitution of an effective chemical agent as a disinfectant for that now in use.

For some time past it has been the practice to sprinkle over the meat a portion of impure commercial carbolic acid, directly after it has been taken from the salesmen's shops to the "Condemned Meat Shed," situated at the eastern end of the Central Meat Market at Smithfield. In this shed it remains until a sufficient quantity is collected to fill the carts, which convey it to Deptford ; its detention, however, rarely extends beyond the day upon which it has been seized, but when the bulk is unusually and suddenly very great, it has been found impossible to remove the whole of it on a Saturday, and a portion is therefore left until the following Monday, during which time the place and its surroundings are saturated with the pungent smell of the carbolic acid.

Ordinarily, and when small quantities only have to be dealt with, the meat, so charged with acid, is removed to Deptford in carts belonging to the Commissioners of Sewers, which are kept for that purpose ; but when seizures of greater magnitude occur, as when many* tons are taken in one day, it becomes

* On October 14th, 1876, thirty-five tons of putrid meat were seized.

necessary to employ extra cartage, whereupon an obstacle is raised by the owners of the waggons and their workmen, who allege, that the contact of the carbolic acid on the meat with their persons, clothing, and vehicles, renders the two former a nuisance to themselves and their neighbours, and destroys the latter for the ordinary purposes of such conveyances ; they therefore positively refuse to carry on the work under these conditions. In this contingency a temporizing process has been adopted, and instead of the liquid acid being used, a so-called "Carbolic Powder," containing some 15 per cent. of carbolic acid, with a base of soft sand, dead lime, or other inert material, is substituted, and a portion, and I fear *only* a portion, of the meat is dusted over with this compound.

Carbolic acid (or phenic acid, or phenol) was originally selected for its supposed power of arresting those changes of structure which result from the decomposition of nitrogenous organic matter, the chief of which are fermentation and putrefaction ; and of so metamorphosing the results of such catalysis as to render them innocuous to man and the higher forms of animal life.

No doubt exists that this agent, when chemically pure, it being then in a glacial or crystallized state, possesses some power in arresting septic and zymotic action, if used at a given strength, but as the crystallized acid is costly, and the quantity required at times very large, it was hoped that an inferior article, termed "Commercial Carbolic Acid," would have sufficed for the purpose.

This impure acid is mixed with certain dead and nameless tar oils, and other ingredients, such as *pyridine* and *picoline*, &c., &c., which cannot be separated in its manufacture without greatly increasing the cost; the last named are perhaps the most stinking substances in the wide range of foul odours, and, being volatile like pure phenol, readily give out their evil vapours. The tarry and sulphurous odours which arise from these compounds have a most offensive and suffocating effect upon some individuals, and in my own person I owe many painful headaches and attacks of nausea to this cause; it is, moreover, very destructive to all textile fabrics, and is altogether an article which has very few disinterested admirers.

Besides being a nuisance to the olfactory senses, some apprehension has been expressed of the possible danger to health by the transit of so much diseased and putrid meat through crowded neighbourhoods ; but the fact is, that the prejudice which dictates such feeling is engendered, not by the smell of the meat, however putrid, but by the fumes of the carbolic acid by which it is moistened.

From these causes it will not be wondered at that complaints have been made of the nuisance created by its free use from the people residing in the immediate vicinity of the Condemned Meat Shed ; nor can it excite surprise that the Metropolitan local sanitary authorities, through whose districts the carts travel on their way to Deptford, have made official objections to the same, and have even threatened legal measures to compel a discontinuance of the practice.

Pure phenic acid is not open to the same objections, but, as I have said, it is too valuable a commodity to be used for the purpose under review, in addition to

which it is so sparingly soluble in water (about 5 per cent. only will dissolve), that its employment on a large scale in a dilute form would be unsatisfactory.

Recent researches* have shown that as a disinfectant (that is, as an agent having the power of preventing the changes due to operation of azotized ferments) carbolic acid has been much overrated, and it has been proved by direct experiment that it is quite inoperative, excepting when at least 3 per cent. of pure acid is used to any substance submitted to its action, and, moreover, that, as an aerial disinfectant, it is absolutely useless.

There is, however, one redeeming advantage in the use of carbolic acid with the condemned meat, which is, that it entirely prevents all possibility of the said meat being used for any kind of food by unscrupulous persons, and this is the chief, if not the only reason why so disgusting a fluid has been so long retained. The meat so treated never loses the characteristic and pervading

* Dr. Baxter on an Experimental Study of certain Disinfectants: Reports, Medical Officer, Privy Council, No. VI., 1875.

smell of the acid, and no known process can purify it from the pungent smell and loathsome taste thereof. This is certainly a great protection against any tampering with it for subsequent use as food for man or animals, but it also lessens the value of the products of such meat after it has been disintegrated by steam, or by other means, and deprives the manipulators of the process of the main source of profit, *i.e.*, the fat, which cannot be sold even for the commonest kind of soap, or friction grease, owing to the chemical action of the carbolic acid on the fatty molecules.

Hitherto it has been taken for granted that no other material would effect this essential purpose, but I shall proceed to show that this opinion is fallacious.

I have dwelt somewhat upon this subject, because the use of carbolic acid has been so long sanctioned, if not approved, by persons whose judgment is entitled to respect, for the purpose under consideration, that any suggestion for its abolition may be viewed with distrust.

For the reasons given, it is my intention in the future to treat the meat in a totally different way. I purpose to abandon carbolic acid altogether, and to substitute the following method, viz.:—

When the meat reaches the shed, it will be placed immediately into a large tank, 8 feet long, 4 feet wide, and 3 feet 6 inches deep, made of $1\frac{1}{2}$ inch slabs of slate, and having a capacity equal to about 700 gallons, so that a whole side of beef can be immersed in it at once. The tank will be partially filled (one-third to a half) with a solution, consisting of water, "Cooper's Salts," Proto-Sulphate of Iron, and Picric Acid.

Cooper's salts are composed of the waste chlorides of commerce, and contain, approximately, 80 per cent. of powerful antiseptic substance, and about 20 per cent. of hygroscopic water ; they are inodorous, perfectly harmless to man or animals, free from deleterious ingredients, and have no chemical action upon metals or fabrics. They act in virtue of the power the chloride of sodium (common salt) is known to possess of arresting change in albuminous substances ; and

the chloride of calcium is added because this salt exercises a specific action upon animal tissues undergoing incipient decomposition, inasmuch as it forms the insoluble and inert albuminate of lime under those conditions. Upon analysis the chlorides were found in the ratio of 30.75 : 42.46, but this varies with circumstances, upon which I need not dwell. The materials are obtained from the large alkali works in various manufacturing districts, and can be had in any quantity ; they are crushed by heavy machinery, and mechanically mixed together in the above proportions. There is no secret in their preparation, but being the subject of a patent, I presume they can only be purchased of the proprietor or his agents.

I find that any putrid or stinking meat is immediately deodorized in a watery solution of these salts, and this would alone suffice for preventing any unpleasant olfactory effects during the moving of the meat to its destination when it leaves the shed, but it would not, *per se*, render the meat unfit for manipulation for food by dishonest operators into whose

hands any portion of it might, by accident or design, fall. To fulfil this requirement, I propose to add to the solution picric acid, and the ordinary crude proto-sulphate of iron, (green copperas), which will discolour the meat and render it so disgusting to the taste, and entirely unfit for human food, that no fear need exist as to its improper appropriation. The solution, or bath, thus prepared will suffice for a large quantity of meat and offal, and will, I anticipate, last for many operations ; indeed, I can speak positively upon this point, having had the opportunity of trying it upon a large scale, and my own experiments upon the subject lead me to feel sanguine that I have not over-estimated its power.

In times of great pressure, as for instance when a huge bulk of meat is suddenly cast upon the Inspectors by the failure, for want of ice, of a ship load of American beef, *a highly concentrated bath** may be used, into which the meat should be soaked for one hour, special precautions having been taken to ensure the entry of the preserving fluid into its sub-

* For directions for making the bath, *vide* Appendix.

stance ; after which it can be removed from the tank to make room for more, and will remain perfectly odourless for at least twenty-four hours, during which time all putrefactive fermentation will have been arrested by the gradual transformation of the albuminoid matter. A judicious economy of time will be effected by the process, which can be continuously repeated, until a very large quantity of material has been dealt with ; in the meantime the carts will remove it, as fast as practicable, to the place where it is to be ultimately destroyed or utilized.

Not the least of the advantages to be derived from this plan, will be that it deodorizes, and renders harmless, the filthy "plucks" and offal, which sometimes accumulate in large quantities in the market, and which frequently create the greatest nuisance of all the material taken to the shed.

A simple arrangement of hooks and pulleys in connection with a beam in the roof overhead, will be the only gear required to lift the heavier portions of meat into and out of the tank, and from thence into

the cart, or other receptacle, and smaller pieces may be dipped in and out by means of a cradle.

Eastern travellers who have visited the Dead Sea, where nothing lives, will be able to form some idea of the efficacy of the briny bath which I propose to employ.

In another portion of my subject I shall describe the carts in which I suggest this meat shall be taken away, where it will be seen that I have provided for a bath in the cart itself, for use in those cases in which it will not be necessary to take the material to the condemned meat shed at all, but convey it directly from the place of seizure in the market, to its destination out of the City.

[Digressing for a moment, I may say, that under proper management, a considerable portion of the whole quantity of meat seized may be, and should be thus removed, by which, not only labour and material will be economized, but the inconvenience, if not actual nuisance to the neighbourhood, especially

the inhabitants near the shed, so bitterly and persistently complained of, much mitigated. All that will be necessary is to provide a sufficient number of carts, constructed as will be seen further on.]

In dismissing this branch of my subject I will only add my firm conviction, that the plan herein detailed will amply provide for all the ordinary requirements of the markets, but its entire success will demand the strictest discipline, vigilance, and intelligence on the part of the Meat Inspectors and their subordinates, and further, that—with these attributes secured—the new system will prove an advantage to all concerned.

Recent experience has shown that there will be times in which the most perfect organization will be baffled and upset by the enormous quantities flooded, without the least notice, upon the Inspectors. When a failure of foreign consignments of meat occurs, sometimes from ten to thirty-five tons have to be dealt with in a single day, of which several such examples happened this summer. (*Vide* Appendix to this Report.)

The difficulty of disposing of such a quantity will be best illustrated by the fact that thirty-five tons of beef represent, an average of weight being taken, the carcasses of 100 oxen, after they have been slaughtered and dressed for the market. No ordinary multiplication of tanks would enable one to thoroughly disinfect such a prodigious bulk of meat in a reasonable time, and hitherto it has been sent away in its stinking condition to the discredit of your staff. [In short, the lesser evil of getting rid of it anyhow has been perforce adopted.] For the future the scandal thus created will be lessened, both by the use of the chemical bath, and by the substitution of properly constructed carts for ordinary waggons.

In such contingencies the Commission has hitherto been put to great additional expense to cart the meat rapidly to Deptford for destruction, and it may be worth while to consider how far the consignors or their agents are liable to reimburse the ratepayers such outlay, rather than adopt the proposal recently advanced by their advocates that some recompense should be allowed them for the loss of the

same, especially as these gentlemen are only too eager to avail themselves of the machinery supplied by the Commission for the gratuitous and speedy riddance of their unsaleable commodity. The question is one of great magnitude, and it may be considered a political problem as to how far the public burdens should be increased for the protection of unsuccessful speculators.

The **second proposition** deals with the kind of conveyance in which the condemned meat shall be taken to the place at which it is to be further treated. I have taken some trouble in this matter, and have examined all the vehicles now in use, as well as the contrivance of a respected Member of your Honourable Court, which I admit has been thoroughly thought out, ingeniously devised, and well executed—none fulfil the requisite conditions, although Mr. Rudkin's invention comes the nearest to my wants—this, however, being of galvanized iron will not be suitable for my solution for chemical reasons, and I reluctantly

abandon the hope of availing myself of this otherwise clever piece of mechanism.

I have, therefore, designed two vehicles of different sizes, but otherwise constructed on the same principles.

The larger one will hold $4\frac{1}{2}$ tons, and weigh 25 cwt., and the smaller one $2\frac{1}{2}$ tons, and weigh 16 cwt.; in each the body is made as low on the ground as possible, to facilitate the delivery of heavy portions of meat from the men's shoulders, and this necessitates the use of crank axles; the carts may therefore be said to be, practically, *cisterns on wheels*—they should be made of oak, carefully dovetailed, and jointed with red lead up to a given height to ensure their being water-tight—this will allow the disinfecting solution to be placed in the bottom of the cart before the meat is thrown in, by which means it can travel any distance without the slightest smell or nuisance,—proper covers are provided which should be securely fastened by lock and key; and the driver should be a responsible person. It will be seen that owing to the

body of the cart being so near the ground, it cannot be made to "tip," which would save labour, if it were possible. The further details of these carts will be sufficiently explained by an inspection of the plans. The estimated cost of the large waggon is £90—and that of the smaller one £60—one of the former and two of the latter might be sufficient for present service, assuming they were able to make two journeys a day, by which 16 tons of meat could be removed. Under proper regulations, systematically and faithfully carried out, the bulk of it could be carted away without being taken to the meat shed at all, by which, as above stated, much delay and expense for labour and material would be saved.

On extraordinary occasions both the meat shed and the carts would be in active requisition, and should the importation of foreign meat, before referred to, assume larger dimensions, you will find it impossible to carry on the work without at least one additional Inspector and more labourers.

The aggregation of the food markets at Smith-

field requires the constant supervision of the two present Inspectors, and their duties will be still further increased when the Fruit and Vegetable Market is opened, since these will also require their attention.

It should be remembered that the Inspectors have also charge of Aldgate and Leadenhall Markets, and that their duties at these places detract from their efficiency at Smithfield, since they are not ubiquitous.

The **third proposition** is perhaps the most difficult of all from a sanitary point of view, and certainly of the greatest importance upon administrative grounds : it constitutes the chief reason for prompt action, since the desire of the Sub-Markets Committee to relinquish their charge of the condemned meat and determine their agreement, places you in a position of temporary embarrassment as to the wisest course to take.

I submit three methods for your consideration :—

(a) To invite tenders from persons willing to utilize the condemned meat, for the purposes of various manufactures ; such contract to provide for the *immediate* removal of the same from any of the markets to some suitable place outside the City of London, and to include all necessary appliances and labour, excepting the *special* waggons, which should be found, and maintained in repair, by the Commissioners of Sewers.

(b) To provide specially constructed barges, containing one or more water-tight compartments with properly fitting covers, secured under lock and key, to receive the meat and keep the same in the disinfecting solution until a sufficient load be obtained, when it could be either taken to the wharf of any person willing to receive it by the river side, or deposited in the sea beyond the reach of tidal influences.

(c) To receive the meat at Lett's Wharf and destroy or utilize it there.

(a) This is the simplest, and if it could be effected with responsible persons, would relieve the Commissioners from any further anxiety upon the subject.

To understand the basis of the suggested contract, I must now state the probable quantity of material involved, and estimate, approximately, its value. Referring to the Meat Inspectors' weekly reports, I find that during the years 1874, 1875, and 1876, no less than 585 tons 2 cwt. 1 qr. were seized in the various markets, the bulk including poultry, plucks, and offal ; thus: in 1874, 193 tons 18 cwt. and 2 qrs., in 1875, 153 tons 1 cwt. and 1 qr., in 1876, 238 tons 2 cwt. and 2 qrs. were removed to Deptford. These figures give an average for the three named years of 195 tons 0 cwt. 3 qrs. per annum ; and, as indicating that the tendency is upwards, I may add that the seizures from 1st January to 30th June of 1877 amount to 120 tons, including poultry, plucks, and offal ; of which about 50 tons consisted of American meat.

If a contract for the removal of these 195 tons of meat and offal, &c., was offered for public tender, I

have reason to believe that persons would be found willing to pay from sixpence to eight pence per stone of eight pounds (either of which would be far within its manurial or commercial value), and undertake to defray the whole of the charges in relation thereto, excepting providing the waggons, and loading the same in the first instance at the market. Assuming that sixpence a stone only was obtained for the above quantity, the contractor would pay annually to the Commissioners the sum of £1,365, and this amount would materially lessen the present and future cost of administration, and the maintenance of waggons and other appliances.

Should this solution of the difficulty commend itself to your notice, the most stringent precautions must be instituted, whereby all interference with the meat *in transitu* will be rendered impossible. Each cart or waggon should be locked under the personal superintendence of an Inspector, and security given that on no account shall these be opened, excepting by a responsible agent of the contractor, and *at the place of destination only*. The details of the arrangement need not be further mentioned here.

For several years prior to 1872 the Commissioners contracted with different persons for the removal and destruction of the condemned meat, after it had been rendered unfit for human food, and this plan obtained until the Sub-Markets Committee undertook the business, at the above date.

(*b*) Embraces the somewhat novel idea of conveying the whole of the meat, &c., to the sea, and submerging it beyond the reach of tidal influences, say outside the Nore Light Ship; for which the consent of the Corporation of the Trinity House must be first obtained. The necessary plant would include a 30-ton iron hopper barge, decked over, with high combings, and provided with large discharging doors or flaps in her bottom, which are opened and closed by chains from a winch placed in a centre platform extending from side to side, with hatchways, which should be covered in with hatches and tarpaulins, made fast and locked as in bonded lighters for Custom-house work. The hopper should be capable of holding 25 tons. Such a vessel can be obtained for about £450, and could be managed by one man; the cost

of towing her to the Nore, and returning her to any wharf in London, would be £7, and the time occupied there and back never exceed a day. (*See Sketch.*)

In this hopper barge the meat could safely, and without any noxious effects, be allowed to remain at your own wharf until she was full, so as to avoid the expense of the tug as much as possible.

The method of discharging her cargo is as follows : the flaps or doors at the bottom of the hopper are held tight by two chains with spans until the compartment has to be emptied, when, by a winch, or some such simple mechanical contrivance, these are relaxed and the flaps fall downwards ; the rapid clearing of the contents of the hopper being facilitated by its sides converging. The moment this is effected the flaps are raised and secured, and the sea water which enters in the meantime (about two tons) is pumped out by hand.

An alternative plan would be to provide the means

of delivering the meat to the water-side premises of a contractor, who might be willing to purchase the same if taken to his place, but who would not undertake the labour and expense of fetching it. Here an ordinary flat-bottomed 35-ton barge would suffice, open or decked over according to the method settled upon for loading her; thus she might be divided into compartments, made water-tight, to contain the disinfecting solution, into which the meat might be lifted in and out; in which case she must be decked over and her contents securely sealed from any unauthorized interference, and from the action of the weather, particularly the sun's rays (with these precautions the meat might be allowed to accumulate without inconvenience, until the compartments were filled, so that there would be no necessity for her to leave her moorings, when from boisterous weather, or other circumstances, her voyage would be attended with more than ordinary risk); *or*—in order to save the time, labour, and expense of thus emptying her—it might be desirable to load her with movable tanks constructed of oak or elm, well bolted together, and in shape somewhat like a horse-box, made to hold

two tons each, which could be lifted in and taken out of her by cranes, when an open barge would be best: such a craft, of the tonnage named, should be 30 feet by 13 feet on the bottom, and 5 feet deep, and if constructed for river navigation only, could be built for about £250—or a 40-ton iron barge would cost £350—and worked with oars by one man. If the wooden tanks were used, they should be likewise so made as to be able to retain the disinfecting solution into which the meat could be delivered from the carts bringing it from the market, and kept there until ready for shipment upon the return of the barge, should she be away. Such tanks would cost about £30 each, and four of them would be enough to commence with.

In the event of very large quantities of meat having to be dealt with suddenly, the tanks might be laid aside *pro hac vice*, and the meat delivered into the barge direct, by which means twenty-five tons could be removed in one journey.

The adoption of this suggestion will sensibly in-

crease the means of collecting and carting away meat from the market when the waggons are insufficient for the purpose, and in this way the haulage-power will be greatly augmented, and the stowage for temporary purposes supplemented. Should this method be approved, a strong trolly will be wanted, and a sketch of one is herewith submitted, which will answer every purpose, at a cost of £45 (*vide* Appendix) ; besides which, a crane, having a lifting power equal to three tons, and a lean-to roof to protect the tanks from the weather, would be required. A crane to lift three tons can be purchased for £55; or one to lift five tons for £85.

In either of these modes the meat would be kept free from smell and all putrefactive action arrested, so long as it remained immersed in the disinfectant, so that no nuisance could arise either during the time it was kept at the wharf, or whilst it was being conveyed thence down the river.

My inquiries have extended to sailing vessels, but I find that these are not suitable, since they would

involve great uncertainty in the time occupied by their journeys, and, in addition to their first cost being some fifty per cent. more than for the other descriptions of barges, they would require two, if not three, men to work them instead of one.

In considering this subject it must be taken into account that, having ample waterside accommodation of your own, you will be saved the usual demurrage for barges, which, I am informed, amounts usually to £1 per diem per barge.

I am aware that the Fishmongers' Company formerly conveyed the fish seized as unfit for food in barges, and that such mode of transport was prohibited by the riparian authorities through whose districts they passed, but in this instance the stinking fish was taken in barges, without proper precautions, and a grievous nuisance thereby created, which was very properly put a stop to.

It may be interesting to state that the average seizure of fish by the Inspectors for the last three

years amounts to 377 tons per annum, and that the present mode of dealing with it is by contracts with persons, who cart it away to certain farms, where it is used for manure. I may add, as showing that the bulk of fish seized is liable to the same fluctuations as pertain to meat, that during the month of August, 1874, the quantity was 112 tons, and in this present month of June (1877) it reached the enormous figure of 179 tons 18 cwt., whereas in March last it was only 7 tons 2 cwt., and in former years has fallen as low as 1 ton in a month. From inquiries I have made of the Clerk of the Company, I am informed that no claim has ever been made by the fish salesmen or the consignors for compensation on account of loss sustained by such seizure. (*Vide* Appendix.)

(c) Must be split into two, for an initial question occurs as to whether the meat should be *destroyed*, or *utilized*; if the former, I see no reason why it should not be burnt as fuel after it has been deprived of its water (some 75 per cent. of its bulk in perfectly fresh meat), in a drying chamber, to be placed near the furnace; nor do I imagine that there would be

any engineering difficulty of ensuring complete combustion of the fibre and fat of the meat, without creating a nuisance in the neighbourhood, since it would only be necessary to provide an additional, or intermediate series of heated bars, over which the first products of the fire should pass in their ascent through the chimney-shaft (which, I am told, is to be carried to a height of 120 feet).

The bone ash will be lost, but for this there is no available remedy which would pay for the working.

The *utilization* of the meat is a subject of wider range, and although several methods occur to me, I will confine my remarks to the only one, I think, applicable to Lett's Wharf. The plan I am about to propose is practically the same as that now in use at Deptford, by which the meat is subjected to treatment with steam for many hours in a close cylinder, technically called an "Extractor," and thereby reduced into *meat-fibre*, *fat*, and *bone*; this, however, properly belongs to the next division of my subject.

The **fourth proposition**, viz., “the most economical and efficient process for the utilization or “destruction” of the condemned meat.

The preceding page includes all that need be said upon the subject of the actual destruction of the meat by the process of cremation, and if I do not pursue the subject, it is rather from the conviction that the Commissioners of Sewers will not readily give their consent to the total loss and waste of products which I hope to be able to convince them are of great commercial value (and which can be obtained by such a moderate outlay as will ensure a fair remuneration for the capital expended), than from any paucity of materials at my command for a more elaborate investigation.

I therefore address myself at once to the easiest and cheapest way by which the said meat can be made to afford some return for the heavy expenses incurred in its seizure by your officers. To effect this the following building and plant will be required to start with, and should be provided immediately,

viz. : a plain brick structure, 40 feet long, 28 feet wide, and 30 feet high. In this building I would place two "Extractors," to be supplied with an independent steam boiler, the boiler to be 18 feet long, 5 feet 6 inches diameter, with internal tube 3 feet diameter, fitted with "Galloway's" tubes, and large steam dome—all the requisite fittings, including double-safety valve, "Bourdon's" steam gauge, feed and supply pipes, and "Gifford's" injector and tank ; also two wrought-iron extractors with taper necks, cast-iron top and bottom rings, with covers fitted and surfaced, and domes fitted, surfaced and hinged on to bottom neck-rings, with counterbalance and weight ; circular perforated disc fitted inside dome to rabbets, also circular inside perforated plates, hinged and fitted with plates and bolts (these perforated plates are to prevent all the meat falling at the bottom of the extractor and allow of the free and equable distribution of the steam), steam and feed pipes, cast-iron circular girders, each supported by centre column, hand railing, and ladders ; wrought-iron jib, crane, winch, pulleys and chain, swivel suspender for covers, and two galvanized iron trucks, &c. The approximate cost

of the building and its contents as above, including every possible requirement, would be twelve hundred and fifty pounds ; or, for building, £500, for machinery, £750 = £1,250.

A reference to the sketch (*vide* Appendix) will explain to some extent the way in which these extractors are erected and worked. Each will hold $2\frac{1}{2}$ tons of meat, and it takes two men four hours to raise this quantity by the windlass and place it in the extractor ; when the latter is properly packed the dome is put on and securely fastened down with bolts and screws ; the steam, working at a pressure of three atmospheres, equal to 45 lbs., is now let in, and maintained at a temperature of 300° Fahrenheit for 18 hours, at the end of which the steam is shut off, and the extractor and its contents allowed to cool, this takes about an hour : in the meantime the fat and water sink to the most depending point of the apparatus and are drawn off by means of a wide-mouthed tap into tubs or tanks : the water, being heavier than the fat, lies at the lowest level, and is allowed to escape until the latter commences to run, when a separate

tank is substituted and the fat collected and put aside to solidify. Some inconvenience and waste has been found to result from the operator not knowing when the stream of water was about to end and that of the fat begin; I have therefore devised a gauge by which this may be in future easily observed. The extractor being sufficiently cool to handle, and all steam having been blown off, the dome is unscrewed and the contents removed; these consist of a reddish-brown fibre of meat, resembling coarse tan; and the bones, which having been deprived of nearly all their animal and fatty matter, are very friable.

It will be seen that the process is neither difficult nor complicated, and I estimate that two extractors would more than suffice for the ordinary quantity of meat seized, and that these, under pressure, would convert five tons in twenty-four hours. The routine work could be done by two men, one of whom should understand the boiler and machinery, and there only remains the cost of steam per diem, which can be readily calculated.

An experiment was carefully conducted for me, at Deptford, by the Superintendent of the Market, on the 11th June last, when the following residuum was obtained from two tons of beef of good quality, *quâ* disease, but putrid, viz. :—

Bone	-	-	-	-	-	2 cwt.
Wet Meat Fibre	-	-	-	-	-	9 cwt. 3 qrs.
Fat	-	-	-	-	-	5 cwt. 1 qr.

I have translated these into percentages for facility of calculation: thus, 100 parts contained :—

Bone (dried at 212° Faht.)	-	5·000 per cent.
Meat Fibre (dried at 212° Faht.)*	13·406	„
Fat - - - - -	13·125	„
Water - - - - -	68·469	„
	100·000	

It was found that the meat fibre, on its being taken from the extractor, contained 45 per cent. of hygroscopic water, which was evaporated off at a temperature of boiling water, and the actual quantity obtained estimated from its dried condition.

* Ten pounds weight of meat fibre, fresh from the extractor, were placed upon a hot plate and subjected to a heat of 212° Fahrenheit for 18 hours.

Bone also retains a large quantity of water, the exact percentage of which is stated below.* The fat produced inaccurately represents the actual quantity contained in the meat, owing to a considerable portion of it being wasted by imperfect manipulation with the extractor.

The proportions above given are probably not constant, and will necessarily vary with the quality of the meat; but I believe the results indicate a fair average yield, for whilst on the one hand the quantity of fat (the most valuable product) would have been much higher had mutton been experimented upon instead of beef; on the other, the great bulk of the meat to be operated upon is seized for putridity and not for disease, and is, therefore, the flesh of healthy and well-fed animals; so that the emaciated condition occasionally observed in diseased animals would not very materially affect the total quantity of fat, whilst the fibre and bone would remain practically the same in both descriptions.

* Twelve pounds weight of bones, fresh from the extractor, were dried at a temperature of 212° Fahrenheit for 15 hours, and being then quite dry weighed exactly eight pounds.

Of late the ratio of diseased to putrid meat has diminished to a very pronounced extent ; for, whereas in 1874 the seizures were 54 tons 11 cwt. 0 qrs. 23 lbs. (diseased) to 96 tons 11 cwt. 2 qrs. 14 lbs. (putrid), they were in 1876 as 49 tons 5 cwt. 1 qr. 1 lb. (diseased) are to 136 tons 15 cwt. 2 qrs. 4 lbs. (putrid); or, for the three years, 1874, 5, and 6, the total quantity was 156 tons 16 cwt. 1 qr. 18 lbs. (diseased) to 284 tons 5 cwt. 1 qr. 21 lbs. (putrid), the ratio being respectively—1874, 1 : 1·8—1875, 1 : 0·7—and 1876, 1 : 2·7.

Two circumstances may account for the diminution in the proportion of *diseased* meat : 1st, the deterring effect of a large number of prosecutions against persons sending such meat to market [from January, 1867, to June, 1877, there have been 185 offenders taken into Court, of these 58 were imprisoned, six acquitted, and the remainder fined in various sums, from Twenty shillings to Two hundred pounds] ; 2nd, the great increase in the importation of dead meat from foreign countries which has come under the notice of the Meat Inspectors, owing to the

failure of the refrigerating process, by which it was endeavoured to deliver it into our Markets free from taint or putridity. The animals were chiefly the finest of their class, and possessed every indication of prime meat, with the full proportion of fat.

These figures would mislead if not considered in connection with the vast augmentation of business done at the Central Market during the last two years, and in order fairly to compare the relative quantity of diseased to putrid meat seized in 1874 with that taken in 1876, it is important to know that the whole bulk of meat which paid toll in 1874 was 158,059 tons, as against 176,163 tons in 1876 ; and I am informed that the first six months of the present year indicate a corresponding tendency. This is exclusive of the enormous quantity of meat dealt in at Aldgate and Leadenhall, which is equally subject to the daily surveillance of the Inspectors ; I am unable to give the weight thereof, or even an idea of its proximate bulk, since no means exist of estimating either, there being no restrictions in the way of toll or other machinery to aid the calculation.

It may be useful to compare the above facts with those deduced from former experience, and the following table is inserted by way of contrast :—

Quantity of Meat Condemned from 1861 to 1873.

Years.	Amount.	WHY SEIZED.		
		Dead.	Diseased.	Putrid.
	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>
1861	141,458	33,619	91,098	16,741
1862	110,046	13,944	78,679	17,423
1863	210,505	20,324	114,120	76,061
1864	229,180	43,497	96,779	88,904
1865	247,827	27,393	124,614	95,820
1866	340,820	21,618	171,051	148,151
1867	287,974	33,387	129,312	125,275
1868	236,953	27,170	101,866	107,917
1869	191,283	25,462	103,132	62,689
1870	126,109	14,169	57,532	54,408
1871	132,388	14,318	77,083	40,987
1872	195,522	19,009	74,463	102,050
1873	178,626	24,538	99,589	54,499
Annual Average }	202,207	24,496	101,486	76,225
or expressed in tons, &c. }	<i>Tons cwt. qrs. lbs.</i> 90 5 1 19	<i>Tons cwt. qrs. lbs.</i> 10 18 2 24	<i>Tons cwt. qrs. lbs.</i> 45 6 0 14	<i>Tons cwt. qrs. lbs.</i> 34 0 2 9

The largest quantity of meat seized in any of the above years was 340,820 lbs., or rather more than 152 tons, and the smallest amount was 110,046 lbs., or barely 50 tons—the average for the whole time being 202,207 lbs., or rather more than 90 tons ; and of this, 101,486 lbs. were diseased, 76,225 lbs. putrid, and 24,496 lbs. from animals that had died from accident.

Before dismissing this part of my subject it may be interesting to state some facts which have been elicited from the experience of the use of these extractors at Deptford, since they have been credited with sundry objections which do not properly pertain to them, if certain precautions are observed ; I allude to the complaints which have been made from time to time by persons in the neighbourhood of the market, of noxious odours alleged to have emanated from the treatment of the meat in the extractors. No doubt these have been justified to some extent, owing to admitted defects in the arrangement of the steam pipes in connection with these articles, although I

think it highly probable that the prejudice existing in the minds of the complainants has been engendered by the smells arising from the trade operations of the gut-makers, and tripe-boilers, &c., of whom there are several in the market. Wherever, and however, these, or any other, methods are adopted for the treatment of diseased meat, there will exist alarm of some possible contagion in the minds of the ignorant section of the public ; and nothing will dissipate the fear of a danger which has no existence, excepting in the imagination of such people, so long as their nasal organs are assailed with vile, if not pernicious, odours. It is, therefore, incumbent upon those who have the direction of this necessary, albeit disagreeable duty, to fence around the business every conceivable precaution.

The steaming of the meat, pure and simple, would have no more unpleasant effect than obtains with the ordinary method of domestic cooking, but it is not unlikely that the putrid state of the meat, as well as the rapid diffusion in the surrounding atmosphere of the atomised

carbolic acid mixed with steam at high pressure may have added to the nuisance. This evil might be avoided by a more careful admission of steam, so as to prevent any action of the safety valve whilst the apparatus is at work ; or, the compressed steam liberated by its action might be made to discharge itself into a tank of cold water instead of directly into the air ; nor would there be any difficulty in conducting it to the chimney-shaft, where it could be of use in assisting the up-draught, and so aiding combustion. Another contributory source of annoyance is the opening of the draw-off tap before the bulk of steam has been discharged, or allowed to condense by cooling (to an extent which would not prevent the flow of the fat), from which no corresponding advantage accrues.

In making a personal inspection of the arrangements of the steam supply at Deptford, I observed that in order to economize its distribution the steam was carried on to the hot-water cisterns in connection with the slaughter-houses and elsewhere,

after it had supplied the extractor ; and that no mechanical contrivance was adopted to prevent the said steam in its passage onwards from becoming charged with the powerful and condensed odours arising from the materials in the extractor. For this reason I am of opinion that all the requisite machinery should be provided for the exclusive supply of the extractor, and hence I have suggested an independent boiler in describing the necessary plant.

The fifth proposition.—The commercial value of the three principal constituents of meat as seized in the markets, viz., *flesh*, *fat* and *bone*, in their raw state, is as follows :—

The flesh, *i.e.*, the soft parts of the animal, minus the fat, has a commercial value, independent of its use, as a manure ; for instance, it is employed in some of the arts and manufactures, and notably in making prussiate of potash. It contains at least 20 per cent. of solids, and yields 3 per cent. of

ammonia, and it ought to fetch a penny a pound all round, leaving the purchaser to deal as he thought best with the fat and bone. If this price had been obtained upon the seizures of 1876 the aggregate would have amounted to the respectable sum of £2,222 10s.

The fat is the commodity most sought after, and will realise prices according to its condition; that taken from *diseased* animals is probably contaminated to a slight extent only, owing to the fact that animals when discovered to be out of health are disposed of as rapidly as possible, to save the cost of their feeding, so that their ailments, as observed post mortem, are chiefly those of the acute inflammatory type, since they are not ill long enough to produce any very extensive change of structure, beyond the rapid wasting of the muscles from want of nourishment, whilst the fat from the meat seized for *putridity* alone will not be sufficiently altered in its composition to materially lessen its value for commercial purposes. Apart from these considerations it must be remembered that every particle of meat seized will have been

disinfected before it leaves the custody of the Inspectors.

The percentage of fat in all meats cannot be correctly estimated; so much depends upon the season of the year, the method of feeding, the peculiarity of breed, the age of the animal, and their condition of health, especially in cows and sows during and after lactation: invariably more fat is obtained from mutton than from beef, weight for weight, both in good and bad meat.

In healthy and well-fed sheep the fat often exceeds 40 per cent. of the total weight of the meat as sent to market, and in fully-fed beef 25 per cent. It is true that these quantities are not forthcoming in the meat seized by the Inspectors; but this, apart from the question of *diseased* animals, arises from the circumstance of the butchers having cut away a large portion of the fat before the meat is removed from their premises, a practice I recommend should be forthwith prohibited, since it cannot be safely used for human food; and it would be wiser, in the

interests of the public health, to insist upon the whole being delivered up to the Inspectors, even should that course involve an equitable claim from the salesmen for whatever additional loss they may sustain in consequence, which might be fairly and generously considered.

Fresh fat from the salesmen sells for from £25 to £32 a ton, and the rough and often stinking fat from the marine store dealers fetches from £15 to £16 10s. a ton, although full of impurities, and containing a good deal of water and salt.

Bone.—Wet bones from the butchers at the markets vary in price from £5 to £6 a ton, and even those obtained from the rag shops from £4 to £5, although very dirty, and with a considerable quantity of fibrous material sticking to them.

Supposing then that these three substances had been sold by the Commissioners at the above prices, the amounts obtained from the disposal of the 238 tons of meat seized in 1876 would have reached

the following sums, viz., the *entire bulk of meat* (including fat and bone) at one penny per pound £2,222 10s.; the *fat* (if it had been separately extracted from the flesh and bone, and had yielded the moderate amount of fifteen per cent. of the total bulk—equal to 35 tons 14 cwt.—at the rate of £30 per ton) £1,071; and the *bone* (assuming a proportion of ten per cent., or 23 tons 16 cwt.) £119. It follows, therefore, that the simplest and most profitable of the three methods would be the first, since, apart from its greater value, the two latter could not be produced without the employment of labour and machinery.

The **sixth proposition**, of necessity, includes considerations of a theoretical and technical character, and although some may think them out of place here—and I would for other reasons have gladly omitted all allusion to them—I feel I cannot make the subject intelligible without endeavouring to elucidate the grounds upon which I base my calculations of the

manurial or fertilizing, and therefore commercial, value of the three products of the meat, viz., *fibre*, *bone*, and *fat*, as they are taken from the extractor in the manner described at pages 38 and 39.

Meat fibre has been long recognised as a manure both in this and other countries. With us the flesh of horses, after it has been separated from the bones by prolonged boiling, has been largely employed by farmers, and in South America great quantities are used at home and exported abroad of the flesh and other parts of the vast numbers of beasts which are annually slaughtered there for the purpose of collecting their fat.

To obtain even a superficial knowledge of the principles which regulate the action of the scientific farmer in supplying artificial substances to the soil for the purposes of his business, we must endeavour to ascertain the nature and quality of the materials upon which the activity of all manures depend ; I therefore subjoin the following table of the same.

PRINCIPAL CONSTITUENTS OF MANURE IN THE ORDER
OF THEIR VALUE.

1. Nitrogen (in shape of ammonia, nitric acid, and nitrogenous organic matters).
2. Phosphoric acid (bone, earth, and soluble phosphates).
3. Potash (carbonate and silicate of potash).
4. Soda (common salt).
5. Soluble silica.
6. Humus, forming organic matters (vegetable remains of all kinds).
7. Sulphuric acid (sulphate of lime).
8. Chlorine (common salt).
9. Oxide of iron, alumina, silica (clay, earth, and sand).

In selecting manures, the educated cultivator seeks, above all others, that which contains the largest quantity of nitrogen, and he finds this powerful auxiliary best suited to his wants in animal substances, for these, as they undergo decomposition, convert their nitrogen into ammonia (three volumes of hydrogen combining with one volume of nitrogen to form, not four, but *two* volumes of ammonia).

It is familiar knowledge that nitrogen in its combined form as ammonia, or as nitric acid, or as it exists in complex principles in decomposing animal or vegetable matter, is "*par excellence*" the most unfailing, valuable, and readiest applied of all fertilizing constituents.

Ammonia, then, may be described as a compound of nitrogen and hydrogen existing in the salts produced by the decomposition of all animal matter. It also exists largely in putrid urine, and in some volcanic products ; for trade purposes it is produced artificially by the action of heat on organic compounds, and has been an important manufacture since the time of the temple of Jupiter Ammon, from which it takes its name. It is the standard by which the fertilizing power of organic manures is estimated, and affords the chemist the means of assigning the commercial value of any such substance submitted to his analysis—thus, an approximate price can be affixed to any material offered for sale as a fertilizer, upon a basis that one per cent. of gaseous ammonia makes a ton of manure worth twenty shillings ; thus, a

substance containing ten per cent. of pure ammonia is valued at £10 per ton, and so on.

Vegetable substances also contain nitrogen, but, as with them the process of decay is much slower, the formation of ammonia is not so quick as with animal matter, and, therefore, the farmer values them the less. Nitrogen in any form exercises a powerful action in manure, but its chief combinations are ammonia and nitric acid.

Ammonia, carbonic acid, and water, derived from the atmosphere and the soil, are the principal organic foods of plants ; in the following proportions, viz. :—

Carbon	-	-	50 per cent.
Nitrogen	-	-	1 to 4 „
Hydrogen	-	-	5 to 6 „
Oxygen	-	-	30 to 36 „

The organic matter in soils is estimated at from 5 to 6 per cent., and is called *humus*, which is composed of certain acid compounds of carbon, hydrogen, and oxygen.

Humus is not the *direct* source of the organic constituents of plants, and is not absorbed as such by their roots, but it is so *indirectly*, in so far as the decomposition which it is constantly undergoing in the soil yields carbonic acid which can be absorbed.

In the vegetable world the absorption of ammonia takes place entirely at the root of plants, and even the minute quantity of ammonia existing in the atmosphere (0.133 parts per million*) is washed down by the rain, and taken up by the roots.

As has been shown, ammonia is the compound derived from the putrefactive decay, or the destructive distillation of nitrogenous substances, and although very extensively found in nature, is rarely evolved in an uncombined state. The importance of ammonia as a fertilizer will be illustrated from the fact, that nitrogen can only be absorbed by plants in the state of ammonia, or of nitric acid, and this absorptive action is much more readily affected with the former of these two.

* The mean of night and day observations by Fresenius.

Next in importance, as a food for plants, is carbonic acid, but as it occupies no place in my present argument I must pass it by.

A superficial acquaintance with these facts will, if I have been fortunate enough to make myself understood, point to the great importance of ammonia, and justify the rank commonly assigned to it in the list of manurial agents.

I will now proceed to apply the principles herein enunciated to a consideration of the money-value of the meat-fibre.

I made a careful analysis of this fibre, with the following results, viz.: one hundred parts contained—

Water	- - - -	5·8
Mineral Matter	-	18·7
Organic Matter	-	75·5
		100·0

The mineral matter consisted chiefly of phosphate of lime.

The 75·5 parts of organic matter yielded 9·6 parts

of ammonia, and based upon this I estimate the commercial value of the meat fibre at £10 per ton, taking the price of real ammonia at 9d. per lb., and making a slight allowance for the value of the mineral matter.

It is highly probable that in the combustion process adopted by the nitrogen determination some of the material was lost, and I feel confident that in assessing the quantity of ammonia obtained I am understating the results.

Referring to the experiment mentioned at page 40, we find that one ton of meat treated in the extractor produces 13·406 per cent. of fibre ; the relative proportion therefore of this substance in 238 tons (the seizures of 1876) would be 31·906 tons, which at £10 per ton would realize £320 within a fraction for this product alone.

This meat-fibre will give up its ammonia to the soil somewhat slowly, in consequence of which its manurial value to the farmer may not be immediately appreciated by that class, but a little experience of its utility will prove to them that it will retain its fer-

tilizing properties much longer than many substances which yield their ammonia more readily, and will thus afford a more enduring food for those crops which take the longest time to attain their perfection of growth.

Other methods of dealing with this fibre might be adopted, but the quantity likely to be forthcoming would not justify the outlay required ; nevertheless if no market were found amongst agriculturists, there would be no difficulty, and very little expense, in extracting the ammonia in the form of a sulphate, and artificially compressing the refuse into cakes (to save space) and burning it as fuel. This could be done periodically as the accumulations of the fibre seemed to warrant.

The value of ammonia being about £84 a ton, the sulphate will be worth one-fourth of that amount.

Adopting the order of manurial value, we must now discuss the merits of bone, as second only to the material just quitted.

Bone as it is found in all animals contains organic as well as inorganic substances, the proportions of which are said to be pretty constant, the ratio to each other is said to be, *in man*, inorganic 65·44, organic 34·56 ; *in the ox*, inorganic 67·98, organic 32·02 ; and the following table shows the composition of bones:—

Animal Matter - - -	30·58
Phosphate of Lime - -	57·67
Fluoride of Calcium - -	2·69
Carbonate of Lime - -	6·99
Phosphate of Magnesia -	2·07
	100·00

By steaming, the whole of the animal matter and gelatine are driven off, and as the bones leave the “Extractor,” they are spongy and very light in weight after the hygroscopic water has dried off by exposure to the air.

One ton of fresh bones will produce 3 cwt. of fat, 3 cwt. of water, and 14 cwt. of actual bony structure.

We must, therefore, remember that only the inorganic constituents remain, and that the bones in

this condition are inapplicable for the various purposes to which they are subjected in the Arts, being alike useless to the cutler, the turner, or the maker of animal charcoal. Ground bones exercise a very important and long-recognised influence over vegetation ; this in a great measure, but not entirely, depends upon the qualities of the phosphates of lime and magnesia. The effects of these upon rapidly growing crops are sometimes described as little less than marvellous. Phosphate of lime exists largely in the grains of wheat, oats, barley, and leguminous seeds, and is, therefore, specially indicated as a dressing for land, in which this principle is found deficient.

Bone dust in what may be called its natural state is considered more permanent than many other manures, and if the bones are not too much comminuted before they are applied to the earth, their effects have been observed to last for several years. I am informed by a practical farmer that if used upon grass lands, of a strength of 3 cwt. to an acre, its stimulating effects will last for three years. This

quality depends upon the comparative insolubility of the phosphatic salts.

When, however, the whole of the phosphoric acid is rendered soluble by the bone dust being dissolved in one-third to a half of its weight of sulphuric acid (oil of vitriol) the action upon the soil is so rapid that probably the whole of its influence is exerted upon the first crops, and in order to maintain its reputation as a fertilizer, its application must be frequently renewed: thus treated, it is eagerly sought for under the name of super-phosphate, and becomes a valuable article of commerce.

The manufacture of super-phosphate is neither difficult nor costly, but I apprehend you will not consider it within the scope of your functions, or mine.

From a careful analysis of the bone obtained in the condition in which it leaves the extractor at Deptford, after it had been air-dried, I find that it contains 31 per cent. of phosphoric acid. This represents a commercial value of £6 for each ton of

bone dust, assuming phosphoric acid to be worth 2d. a pound.

If, therefore, we adopt the same calculation as applied to fibre, and still assume the quantity to be dealt with at 238 tons, we shall obtain 11·9 tons of dried bones, and accepting its theoretical value at £6 per ton, the sale would produce nearly £72.

The *Fat*.—Having already partially dealt with this commodity when descanting upon the fifth proposition, it now only remains for me to add a few words.

The difference between the fat as it exists in the meat when first seized and that issuing from the extractor after prolonged steaming is in favour of the latter for several reasons.

In the first place the fat as collected from the butchers is not pure, having attached to it a proportion of connective (or cellular) tissue, blood, blood-vessels, and lymphatics, and in order to disengage the fat globules from these the mass is

minced by tallow dealers before it is melted, after which it is strained through sieves whilst still in a state of fusion ; the *débris* is then subjected to heavy pressure to squeeze out the remaining fat, and sold as “greaves ” for the food of dogs, pigs, and poultry.

On the other hand, the fat obtained from the extractor will be free from all extraneous material, and therefore weight for weight will be much more valuable than the fresh fat.

It may, however, be thought that the putrid condition of the fat in the condemned meat will destroy its utility, but practically this is not the case, since the odours arising from the peculiar rancidity all fats exhibit after they have been exposed to the air for a certain time (resulting from decomposition, and the formation of volatile “fatty acids”) is easily dissipated by heat, and all impure smell is entirely and instantly absorbed by the steam in the cylinder. The fat, in addition to its being thus purified, would not be otherwise materially altered in its constituents, although it is alleged by some of our best chemists

that all fat undergoes some minute molecular change each time it is melted ; the change, however, is inappreciable, and of no moment.

From a return furnished at my request by Mr. Philcox, the Superintendent at Deptford, to whom I am indebted for much information, I find that the fat obtained from the extractors during 1876 amounted to 30 tons 16 cwt. 2 qrs. 7 lbs., or 13 per cent. on 238 tons of meat. As previously observed, I believe this estimate to be too low, and that a portion of the fat was lost, owing to imperfect machinery. I prefer, therefore, to base my calculation upon 15 per cent., and this would give 35·7 tons ; taking the minimum value of this at £35 per ton, the fat should have sold for £1,249 10s.

It will be perceived from the following table that this price has been actually received from buyers at Deptford in spite of the fat having been permanently tainted with the odour of the carbolic acid, with which it had been sprinkled before it reached the Foreign Cattle Market.

STATEMENT furnished by the Superintendent, showing the quantity of the products of the Condemned Meat
at the Foreign Cattle Market, Deptford, from September 5th, 1872, to December 31st, 1873.

RECEIPTS.

	WEIGHT.		RATE.		AMOUNT.		TOTAL.	
	T.	c. qr. lb.	£	s.	£	s.	£	s. d.
Tallow sold to G. Hearn & Co...	1	2 3	2...	35	0...	39	16	10½
Ditto ..	4	10 0	17...	31	19...	141	19	9½
Ditto Hills & Co.....	2	3 0	21...	32	0...	65	10	0
Ditto	0	11 0	2...	30	0...	16	10	7
							263	17 3
Tallow in Store	4	13 2	0...	29	0...	135	11	6
Soap	2	17 2	0...	26	0...	74	15	0
Bones	4	19 1	0...	8	0...	39	14	0
Flesh Fibre	2	4 0	0...	8	0...	17	12	0
Size	0	7 1	0...	—	...	no value.		
Refuse Tallow	0	5 1	0...	20	0...	5	3	0
							272	15 6

Total weight of Meat from

September 5th, 1872, to De-

cember 31st, 1873 137 6 1 23

£536 12 9

EXPENSES.

Wages paid to Melter and Labourer, from 23rd November, 1872, to 31st December, 1873	178	3	11
Chemicals, Casks, and Sundries	25	1	8
£12 10s. per cent. on £607 14s. 10d., outlay on Building	75	19	4
£10 per cent. on £536 12s. 9d., total proceeds.....	53	13	3
			53 13 3
			332 18 2

Balance..... 203 14 7

£536 12 9

Mr. Philcox further informs me that the buyers of grease will no longer have anything to do with the fat so treated, since they find the action of the acid has a most prejudicial effect upon the structure of the fat, and prevents its utilization for soap-making, friction grease, and the like. In consequence of this objection a large quantity of fat remains now undisposed of, although offered for sale at a considerable reduction from the prices first obtained.

In spite, however, of much difficulty, imperfect appliances, and the fact that the whole of this novel proceeding was of necessity entrusted to inexperienced hands, the results at Deptford afford a considerable profit upon the undertaking, as the preceding statement will show, and although I maintain my opinion that these results fall far short of those to be procured by a more scientific and accurate working of the system, I cannot help saying that they reflect infinite credit upon all concerned in their production.

I have now exhausted the subject, and, in conclusion, have only to express my regret at the length

of this Report. I could not, however, condense it further consistently with a thorough exposition of the whole circumstances.

The suggestions I have herein detailed have been carefully weighed, and the information conveyed to you has been compiled from reliable sources.

I therefore confidently submit them to you.

I have the honour to be,

GENTLEMEN,

Your obedient Servant,

WM. SEDGWICK SAUNDERS.

QUEEN STREET, CHEAPSIDE,

June, 1877.

POSTSCRIPT.

During the passage of this Report through the press the new process of treating the condemned meat suggested at page 14 has been established at the shed at the Eastern end of the Central

Market at Smithfield, and has proved a great success.

A second tank might be erected at Leadenhall with advantage, which would obviate the necessity of carrying the meat seized there, and at Aldgate, through the City before it was deodorised.

W. S. S.

September 3rd.

APPENDIX.

ALPHABET

DIRECTIONS FOR PREPARING THE DISINFECTING
SOLUTION NOW IN USE AT SMITHFIELD.

					Value.	
					s.	d.
Cooper's Salts	-	-	2 cwt.	-	12	0
Proto-Sulphate of Iron	-		$\frac{1}{2}$ cwt.	-	2	0
Picric Acid	-	-	2 lbs.	-	3	0
Water	-	-	- 300 gallons	-	0	0
					17	0

These proportions are for ordinary use, and will keep the bath active and sweet for a fortnight in hot weather, and much longer in colder seasons.

During August 4 tons of meat were thus treated in one bath.

For a concentrated bath the quantities may be quadrupled.

In either case it is necessary to stir the fluid with a broad wooden spatula night and morning.

*Quantity of Meat condemned in the City of London,
for 1874.*

	DEAD.				DISEASED.				PUTRID.				TOTAL.				
1874.	Tons	cwts.	qrs.	lbs.	Tons	cwts.	qrs.	lbs.	Tons	cwts.	qrs.	lbs.	Tons	cwts.	qrs.	lbs.	
Jan. 1 to 10	}	0	4	1	8	1	2	3	19	0	2	3	27	1	10	0	26
17		0	0	3	5	1	15	3	2	0	0	1	17	1	16	3	24
24		0	0	7	21	0	15	3	10	...	...			0	17	3	3
31		0	3	2	21	0	12	2	8	0	1	3	4	0	18	0	5
Feb. 7		0	2	3	24	0	9	0	17	0	2	2	8	0	14	2	21
14		0	1	0	20	0	6	1	11	0	11	2	7	0	19	0	10
21		0	1	1	5	1	8	3	17	0	3	0	14	1	13	1	8
28		0	0	3	21	1	10	1	19	1	2	2	0	2	13	3	12
Mar. 7		0	0	3	12	1	3	1	10	0	3	1	0	1	7	1	22
14		0	0	2	10	1	2	2	17	...	...			1	3	0	27
21		0	1	2	6	1	10	0	11	0	8	2	11	2	0	1	0
28		0	3	1	5	1	3	1	1	0	9	2	25	1	16	1	3
April 4		0	2	3	0	0	3	0	26	0	2	0	16	0	8	0	14
11		0	6	1	11	1	16	2	16	0	13	3	22	2	16	3	21
18		0	9	1	24	0	19	2	12	0	2	1	10	1	11	1	18
25		0	3	1	2	3	4	2	19	1	5	3	23	4	13	3	16
May 2		0	6	0	12	0	19	1	17	3	19	3	13	5	5	1	14
9		0	0	2	6	0	16	0	14	0	6	0	13	1	2	3	5
16		0	3	3	1	1	0	2	13	...	...			1	4	1	14
23		0	5	2	9	1	5	3	7	0	1	2	2	1	12	3	18
30		0	2	0	18	1	2	3	0	0	19	1	10	2	4	1	0
June 6		0	3	1	10	0	15	2	25	1	12	2	20	2	11	2	27
13		0	0	2	11	0	15	2	26	0	25	1	6	2	1	2	15
20		0	1	3	5	0	13	3	3	0	2	0	6	0	17	2	14
27		0	15	2	0	1	1	3	24	0	11	3	8	2	9	1	4
		4	4	2	15	27	17	1	8	14	9	2	10	46	11	2	5

[Carried forward

	DEAD.				DISEASED.				PUTRID.				TOTAL.			
1874.	<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>			
Brought forward	4	4	2	15	27	17	1	8	14	9	2	10	46	11	2	5
July 4	0	5	3	9	0	15	1	12	0	11	3	24	1	13	0	17
11	0	3	3	23	0	11	1	9	1	1	1	26	1	16	3	2
18	0	6	0	21	0	19	0	2	23	15	3	12	25	1	0	7
25	0	2	2	24	1	12	2	11	10	7	1	0	12	2	2	7
Aug. 1	0	0	0	20	1	2	0	23	0	18	3	20	2	1	1	7
8	0	5	0	12	0	12	3	14	1	5	2	19	2	3	2	17
15	0	2	1	8	0	10	1	10	0	18	0	18	1	10	3	8
22	0	7	1	11	0	18	3	4	2	2	0	18	3	8	1	5
29	0	3	3	13	0	3	1	19	2	16	2	0	3	3	3	4
Sept. 5	0	4	1	8	1	5	0	9	2	9	2	16	3	19	0	5
12	0	4	1	10	0	15	1	12	0	16	3	12	1	16	2	6
19	0	0	3	10	1	3	1	19	0	18	3	26	2	3	0	27
26	0	3	1	17	1	19	2	24	3	2	1	7	5	5	1	20
Oct. 3	0	15	0	6	2	1	1	6	16	1	1	10	18	17	2	22
10	0	3	1	24	0	18	3	23	0	9	3	15	1	12	1	6
17	0	1	3	21	2	2	1	5	1	10	2	14	3	14	3	12
24	0	18	1	10	0	9	3	9	6	17	2	3	8	5	2	22
31	0	1	2	26	1	4	3	19	3	2	1	2	4	8	3	19
Nov. 7	0	9	1	21	0	10	1	22	1	4	2	8	2	4	1	23
14	0	0	2	12	1	2	3	3	0	6	1	19	1	9	3	6
21	0	4	1	26	0	18	0	3	0	12	0	27	1	14	3	0
28	0	3	2	16	0	19	0	19	0	7	0	21	1	10	0	0
Dec. 5	0	5	3	0	0	12	0	16	...	...	...	...	0	17	3	16
12	0	1	3	22	0	19	2	9	0	0	1	5	1	1	3	8
19	0	3	3	13	1	15	3	7	0	3	0	6	2	2	2	26
26	0	13	1	16	0	9	0	14	0	0	3	12	1	3	1	14
Poultry, Plucks & Offal for the year 1874 ...	10	18	2	22	54	11	0	23	96	11	2	14	162	1	2	3
	...	...	...	...	...	...	...	...	...	...	...	...	31	16	3	25
TOTAL	10	18	2	22	54	11	0	23	96	11	2	14	193	18	2	0

*Quantity of Meat condemned in the City of London,
for 1875.*

	DEAD.				DISEASED.				PUTRID.				TOTAL.				
1875.	<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>				
Jan. 1 to 9	}	0	3	1	3	1	1	1	12	0	7	2	2	1	12	0	17
16		0	4	1	15	1	4	3	22	0	7	2	5	1	16	3	14
23		0	4	2	12	1	2	0	17	0	10	0	3	1	16	3	4
30		0	2	0	26	1	5	0	1	0	3	3	7	1	11	0	6
Feb. 6		0	3	3	19	1	15	0	20	0	0	2	25	1	19	3	8
13		0	2	0	6	1	1	2	13	0	8	1	16	1	12	0	7
20		0	2	0	16	1	4	2	22	0	2	3	3	1	9	2	13
27		0	0	3	10	1	8	2	18	...	...			1	9	2	0
Mar. 6		0	0	1	21	1	6	1	25	...	...			1	6	3	18
13		0	2	0	27	1	19	3	26	0	2	3	3	2	5	0	0
20		0	4	3	23	0	12	2	5	0	10	1	9	1	7	3	9
27		0	5	3	15	1	16	3	26	0	0	3	13	2	3	2	26
April 3		0	9	1	8	0	17	0	1	0	10	0	5	1	16	1	14
10		0	3	1	10	1	14	1	17	0	3	1	10	2	1	0	9
17		0	1	2	4	1	7	2	5	...	...			1	9	0	9
24		0	3	1	0	0	17	1	9	0	4	2	11	1	5	0	20
May 1		0	3	3	5	0	17	1	25	0	6	3	13	1	8	0	15
8		0	6	0	22	0	16	3	7	0	3	3	27	1	7	0	0
15		0	0	3	4	0	18	0	14	0	13	0	4	1	11	3	22
22		...	...			1	2	1	15	8	8	3	27	9	11	1	14
29		0	1	0	19	0	7	2	14	0	16	1	11	1	5	0	16
June 5		0	3	0	17	0	19	0	10	0	6	2	4	1	8	3	3
12		0	2	3	12	1	12	1	9	1	17	1	21	3	12	2	14
19		...	...			1	11	2	24	0	7	1	14	1	19	0	10
26		0	2	1	26	1	2	1	21	0	1	3	0	1	6	2	19
		3	14	3	12	30	3	3	14	16	15	0	9	50	13	3	7

[Carried forward

	DEAD.				DISEASED.				PUTRID.				TOTAL.			
1875.	<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>				<i>Tons cwt. qrs. lbs.</i>			
Brought forward	3	14	3	12	30	3	3	14	16	15	0	9	50	13	3	7
July 3	0	2	1	8	0	12	2	9	0	7	3	3	1	2	2	20
10	0	1	0	4	0	15	3	8	0	11	3	7	1	8	2	19
17	0	5	3	23	1	2	3	1	0	5	2	18	1	14	1	14
24	0	3	3	14	1	0	1	27	1	15	0	27	2	19	2	12
31	0	6	0	25	0	11	0	10	1	3	2	12	2	0	3	19
Aug. 7	0	0	2	22	0	2	2	6	0	2	0	9	0	5	1	9
14	0	10	1	16	0	12	3	19	4	16	1	25	5	19	3	4
21	0	8	1	27	0	17	0	10	4	15	0	9	6	0	2	18
28	0	5	1	7	0	4	1	27	0	15	1	18	1	5	0	24
Sept. 4	0	2	3	14	0	4	2	19	0	6	0	9	0	13	2	14
11	0	5	2	9	1	2	0	11	1	8	0	11	2	15	3	3
18	0	2	2	10	0	17	1	23	1	12	1	9	2	12	1	14
25	0	17	0	7	1	3	0	24	10	4	0	11	12	4	1	14
Oct. 2	0	1	1	9	0	15	3	15	0	10	1	13	1	7	2	9
9	0	5	3	17	1	2	1	26	0	14	3	21	2	3	1	8
16	0	10	0	21	0	7	1	10	0	3	3	13	1	1	1	16
23	0	6	0	8	0	10	0	3	0	16	2	14	1	12	2	25
30	...	...	...	...	0	13	3	9	0	3	1	14	0	17	0	23
Nov. 6	...	...	...	...	0	2	3	17	0	5	3	0	0	8	2	17
	0	4	0	7	0	12	0	21	0	8	2	19	1	4	3	19
13	0	10	0	21	1	18	2	8	0	11	1	9	3	0	0	10
20	0	4	1	17	1	16	1	6	...	...	...	...	2	0	2	23
27	0	4	1	26	0	12	3	22	0	8	1	5	1	5	2	25
Dec. 4	0	12	3	10	0	18	3	18	0	2	2	10	1	14	1	10
11	0	0	2	13	0	18	3	27	...	...	...	...	0	19	2	12
18	0	10	3	1	1	5	2	3	0	4	0	27	2	0	2	3
25	0	1	0	26	1	2	3	14	1	9	1	2	2	13	1	14
	0	10	2	22	0	10	0	7	0	0	0	15	1	0	3	16
	11	10	0	4	52	19	3	22	50	18	1	3	115	8	1	1
Poultry, ducks & geese for the year 1875	...	...	...	...	...	...	...	...	...	...	...	...	37	12	3	27
TOTAL	11	10	0	4	52	19	3	22	50	18	1	3	153	1	1	0

*Quantity of Meat condemned in the City of London,
for 1876.*

	DEAD.				DISEASED.				PUTRID.				TOTAL.			
1876.	Tons	cwt.	qrs.	lbs.	Tons	cwt.	qrs.	lbs.	Tons	cwt.	qrs.	lbs.	Tons	cwt.	qrs.	lbs.
Jan. 1 } to 8 }	0	3	2	26	0	15	0	13	1	10	1	17	2	9	1	0
15	0	1	3	21	0	10	1	2	0	1	3	4	0	13	3	27
22	0	2	3	5	0	17	2	0	0	4	1	23	1	4	3	0
29	0	0	3	14	0	8	2	7	0	2	1	16	0	11	3	9
Feb. 5	0	8	0	22	0	19	3	2	0	0	1	2	1	8	0	26
12	0	3	3	3	0	15	2	5	...	...			0	19	1	8
19	0	2	2	22	1	6	2	6	...	...			1	9	1	0
26	0	1	2	19	1	11	3	19	0	7	3	10	2	1	1	20
Mar. 4	0	5	2	1	1	0	0	21	...	...			1	5	2	22
11	0	2	3	4	1	1	0	3	0	8	3	20	1	12	2	27
18	0	2	2	11	1	1	3	23	0	2	0	6	1	6	2	12
25	...	...			1	13	0	26	0	5	2	25	1	18	3	23
April 1	0	2	1	8	2	1	2	6	...	...			2	3	3	14
8	0	0	3	4	3	18	1	9	0	10	3	7	4	9	3	20
15	0	4	3	22	1	5	0	22	0	8	0	5	1	18	0	21
22	0	2	0	25	1	8	1	10	0	1	0	18	1	11	2	25
29	...	...			1	17	0	16	0	5	2	19	2	2	3	7
May 6	0	12	0	22	1	6	0	2	0	1	0	10	1	19	1	6
13	0	1	2	2	1	2	0	15	0	3	1	9	1	6	3	26
20	0	0	2	26	0	13	1	6	0	5	2	23	0	19	2	27
27	...	...			0	9	1	27	0	5	2	17	0	15	0	16
June 3	0	1	1	4	0	9	0	21	0	2	0	27	0	12	2	24
10	0	1	0	24	0	6	3	11	0	10	3	4	0	18	3	11
17	0	1	2	6	0	9	2	6	0	8	2	10	0	19	2	22
24	0	4	2	0	0	17	0	10	2	9	0	15	3	10	2	25
	3	9	3	11	28	5	3	8	8	16	0	7	40	11	2	26

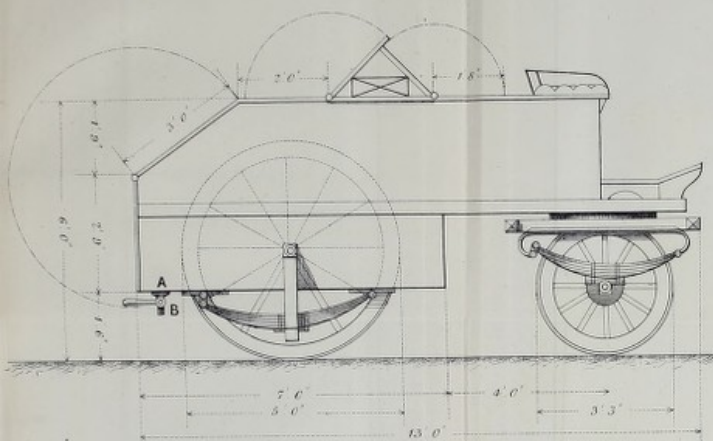
[Carried forward

	DEAD.				DISEASED.				PUTRID.				TOTAL.			
1876.	Tons	cwts.	qrs.	lbs.	Tons	cwts.	qrs.	lbs.	Tons	cwts.	qrs.	lbs.	Tons	cwts.	qrs.	lbs.
Brought forward	3	9	3	11	28	5	3	8	8	16	0	7	40	11	2	26
July 1	0	0	3	3	0	6	0	22	0	14	3	8	1	1	3	5
8	...	...			0	9	0	6	1	17	2	17	2	6	2	23
15	0	3	3	16	0	3	3	21	2	14	1	3	3	2	0	12
22	0	5	2	11	0	8	1	17	18	6	2	6	19	0	2	6
29	0	10	0	5	0	4	3	12	2	15	0	9	3	9	3	26
Aug. 5	0	0	1	10	0	0	2	2	0	1	3	19	0	2	3	3
12	0	6	1	2	0	8	3	27	13	7	0	1	14	2	1	2
19	0	2	3	26	0	2	2	4	3	12	0	25	3	17	2	27
26	0	5	3	6	0	15	3	22	8	4	1	24	9	6	0	24
Sept. 2	0	2	1	25	0	13	1	18	0	9	2	13	1	5	2	0
9	0	0	2	21	0	15	2	6	23	5	3	2	24	2	0	1
16	0	3	3	3	0	7	1	10	0	9	2	25	1	0	3	10
23	0	12	1	4	1	19	1	8	0	18	2	14	3	10	0	26
30	0	4	3	23	1	12	1	27	3	18	1	17	5	15	3	11
Oct. 7	1	7	2	12	1	2	2	4	1	12	3	11	4	2	3	27
14	1	12	1	20	0	19	3	26	32	19	1	7	35	11	2	25
21	0	8	3	24	1	0	0	27	3	0	1	15	4	9	2	10
28	0	9	0	8	1	9	1	2	1	5	3	0	3	4	0	10
Nov. 4	0	2	0	18	0	7	0	23	0	13	3	6	1	3	0	19
11	0	4	3	16	1	0	2	14	0	4	0	22	1	9	2	24
18	0	1	3	4	1	0	3	25	0	2	3	10	1	5	2	11
25	...	...			0	16	3	3	5	2	3	9	5	19	2	12
Dec. 2	0	12	3	4	0	16	0	25	0	7	1	9	1	16	1	10
9	0	10	2	22	0	18	3	0	0	12	2	0	2	1	3	22
16	0	7	3	12	0	14	0	9	0	14	2	2	1	16	1	23
23	0	5	1	26	0	7	0	1	...	...			0	12	1	27
30	0	1	0	22	1	17	0	24	0	7	0	3	2	5	1	21
Poultry, Pincks & Offal for the year 1876 ...	12	14	2	18	49	5	1	1	136	15	2	4	198	15	1	23
	...	...			...	...			...	...			39	7	0	5
TOTAL	12	14	2	18	49	5	1	1	136	15	2	4	238	2	2	0

*Quantity of Fish seized at Billingsgate Fish
Market as unfit for Food during the years
1874, 1875, and 1876.*

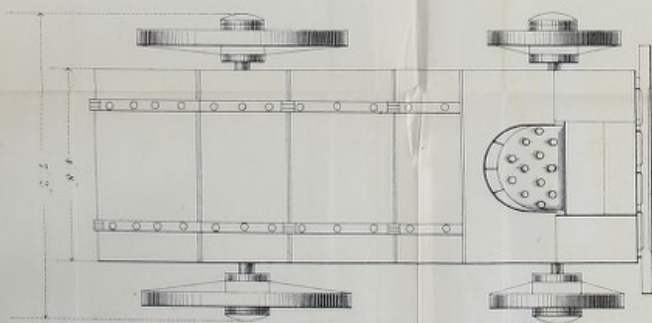
	1874.			1875.			1876.	
	Tons.	Cwt.		Tons.	Cwt.		Tons.	Cwt.
JANUARY -	4	0	-	7	8	-	1	2
FEBRUARY-	4	0	-	6	13	-	3	18
MARCH -	34	0	-	4	14	-	44	5
APRIL -	45	5	-	12	11	-	11	2
MAY -	37	15	-	33	5	-	10	17
JUNE -	23	7	-	61	2	-	80	11
JULY -	32	15	-	42	11	-	48	10
AUGUST -	112	0	-	87	0	-	54	11
SEPTEMBER	76	0	-	35	18	-	23	18
OCTOBER -	56	3	-	14	12	-	51	9
NOVEMBER	6	17	-	13	2	-	16	17
DECEMBER	2	0	-	18	0	-	11	15
TOTAL -	134	0	-	336	16	-	358	15

PROPOSED MEAT VAN.



SIDE ELEVATION WITH WHEELS OFF. Scale $\frac{3}{8}$ " to one foot.

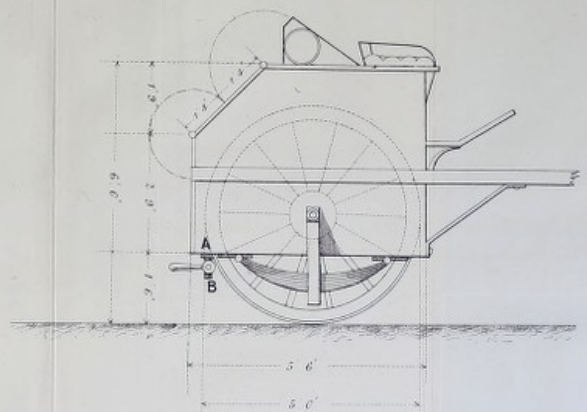
- A. Place for grating to prevent the tap getting choked
- B. Tap for emptying the body of van of its fluid contents



PLAN Scale $\frac{3}{8}$ " to one foot

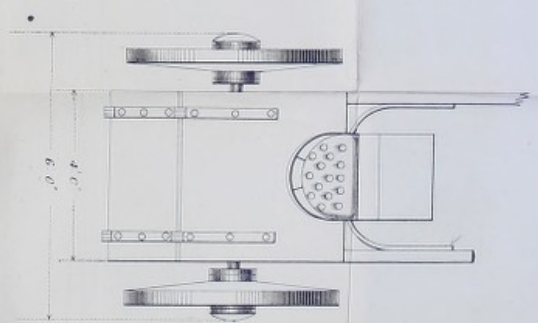
Weight about 25 Cwt.
to carry 4 to 4½ tons of Meat
Cost about 90 £.

PROPOSED MEAT CART.



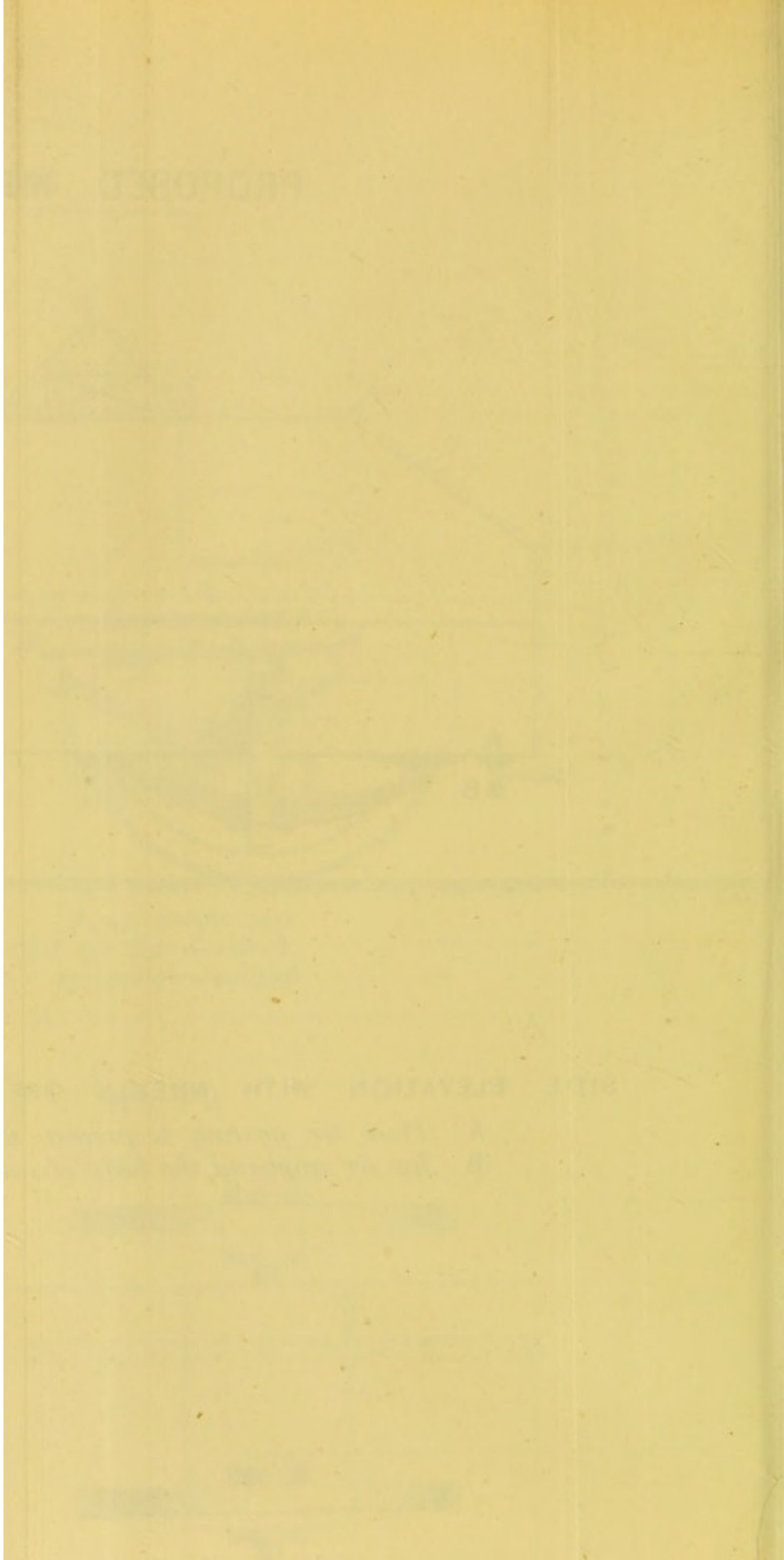
SIDE ELEVATION WITH WHEEL OFF. Scale $\frac{3}{8}$ " to one foot.

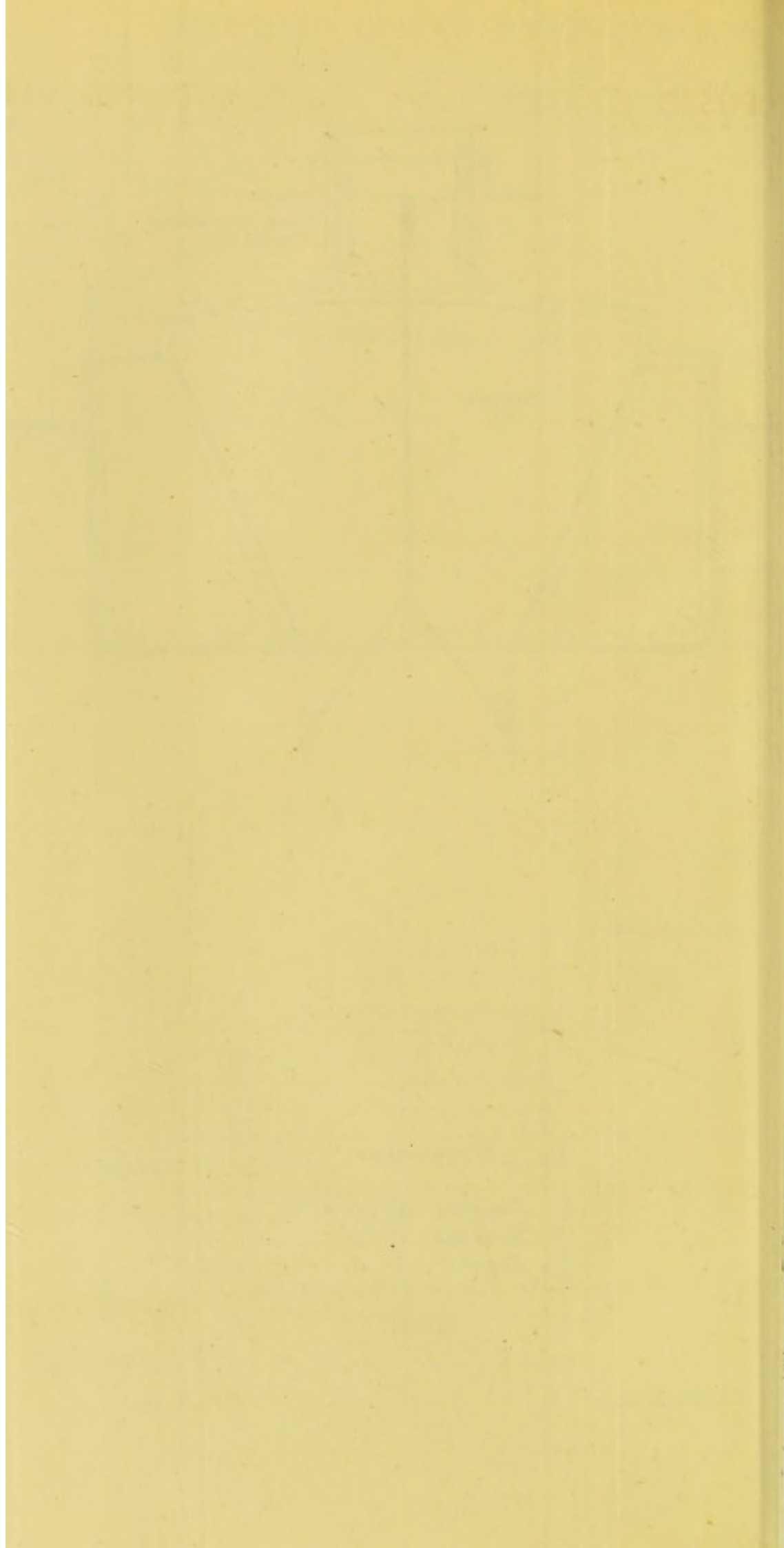
- A. Place for grating to prevent the tap getting choked
- B. Tap for emptying the body of van of its fluid contents



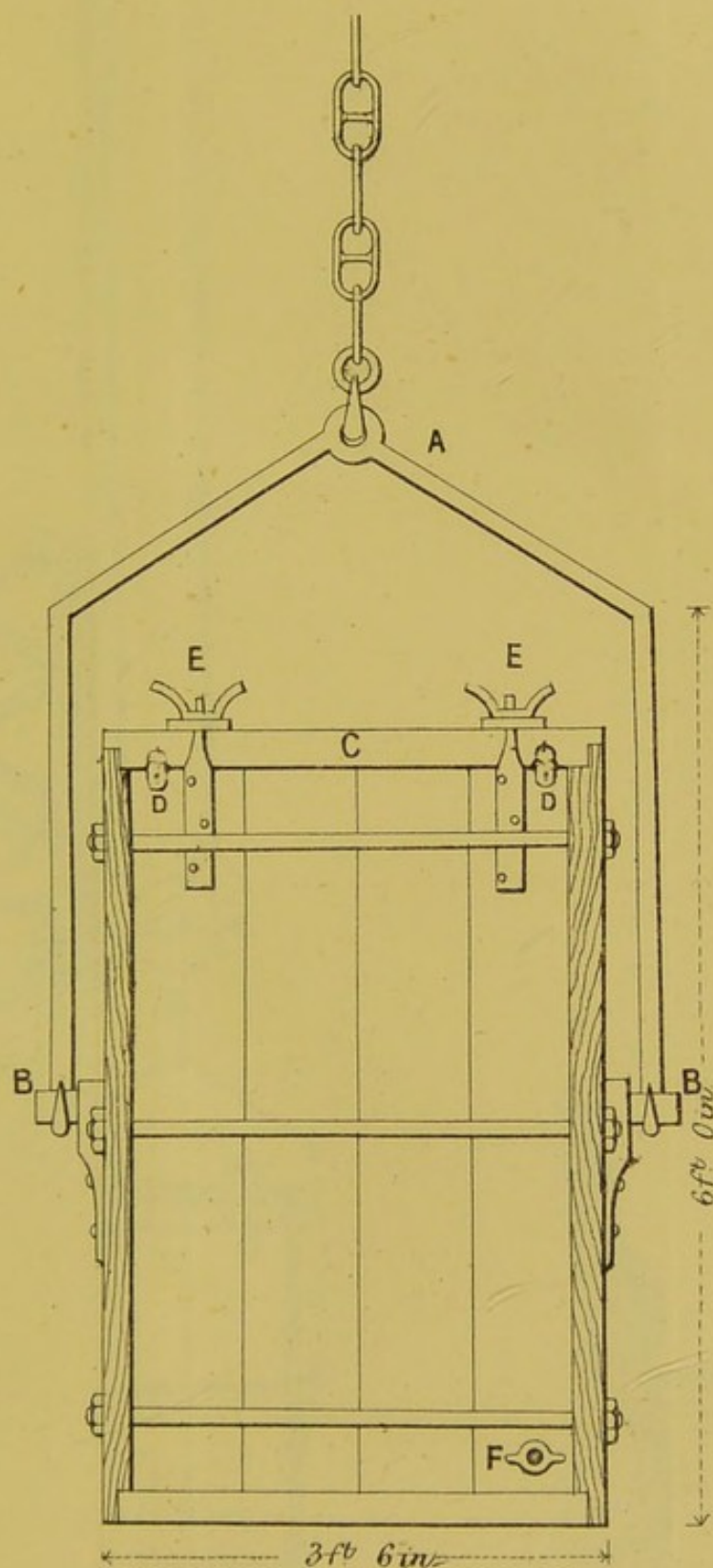
PLAN Scale $\frac{3}{8}$ " to one foot.

Weight about 16 Cwt.
to carry 2½ tons of Meat
Cost about £60.





PROPOSED WOODEN TANK FOR CONDEMNED MEAT.



- A. Slings. B.B. Trunnions, C. Cover. D.D. Padlocks
 E.E. Screw fastenings for Cover.
 F. Screw nozzle for drawing off liquid.

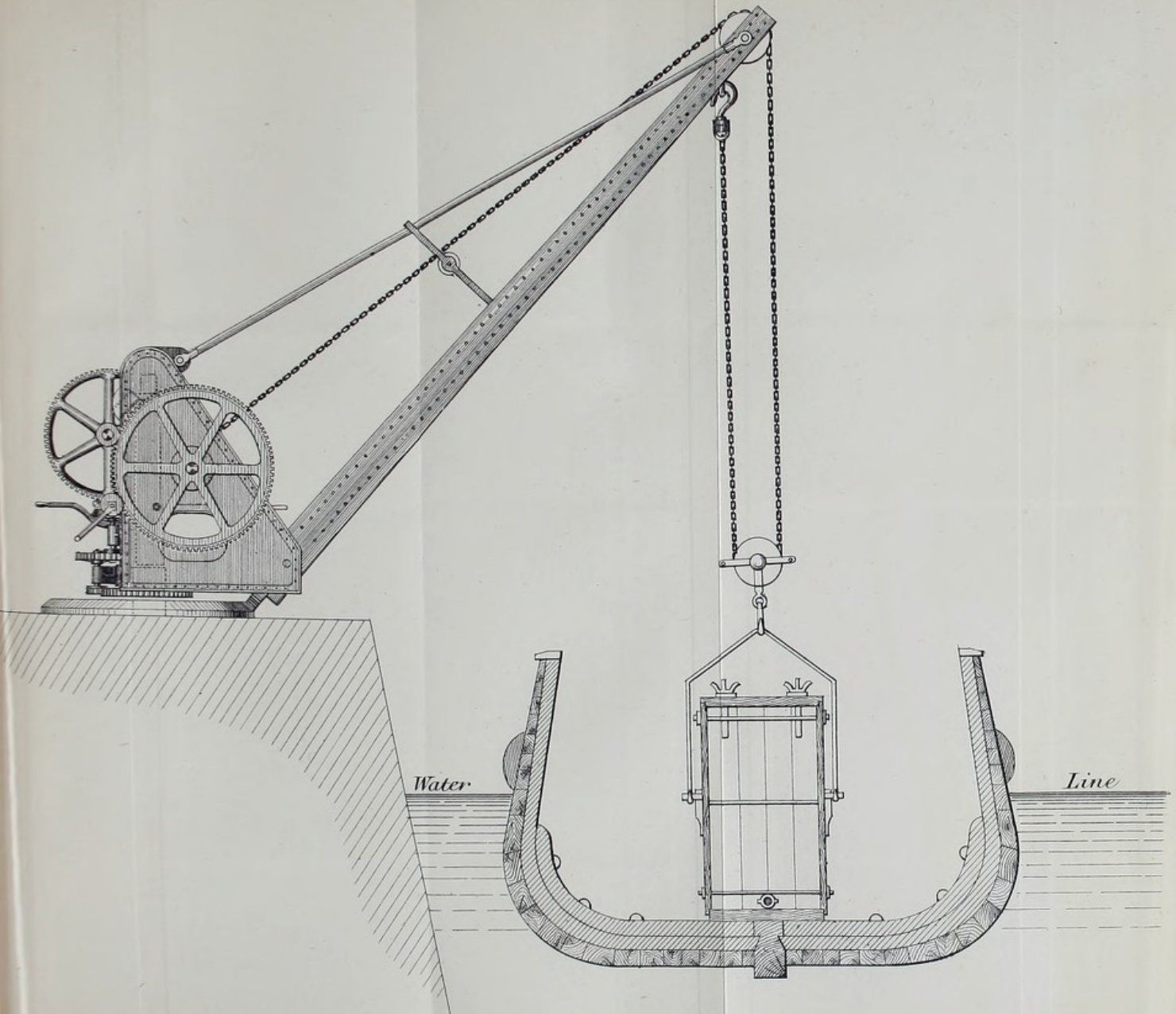
Scale, $\frac{1}{2}$ " to one foot.

WOODEN TANK FOR CONDENSING MILK



Patented by the United States Patent Office
for the reason that it is a new and useful
improvement in the art of making
condensed milk

METHOD OF HOISTING & PLACING CONDEMNED MEAT TANKS IN BARGE

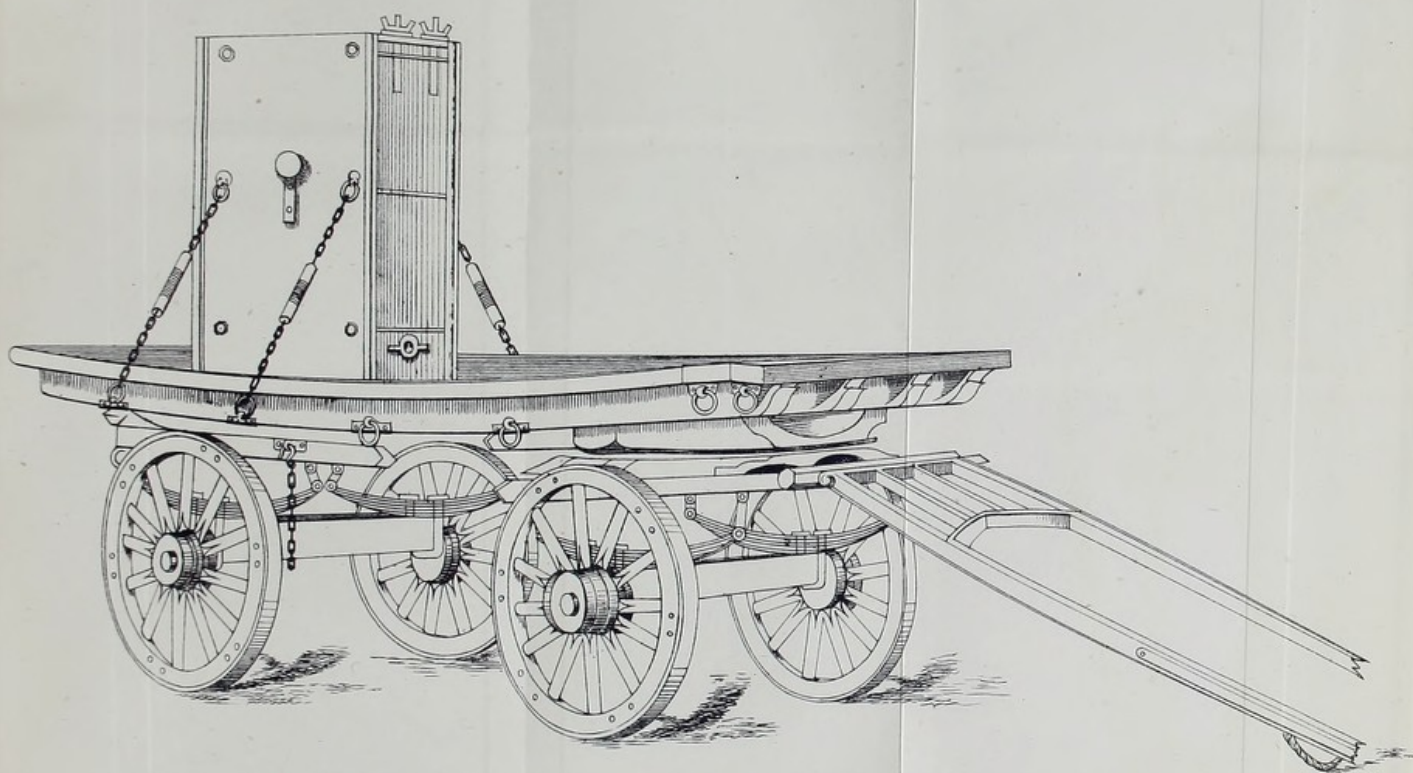


Scale $\frac{1}{4}$ Inch

ALPHABET OF HEBREW LETTERS

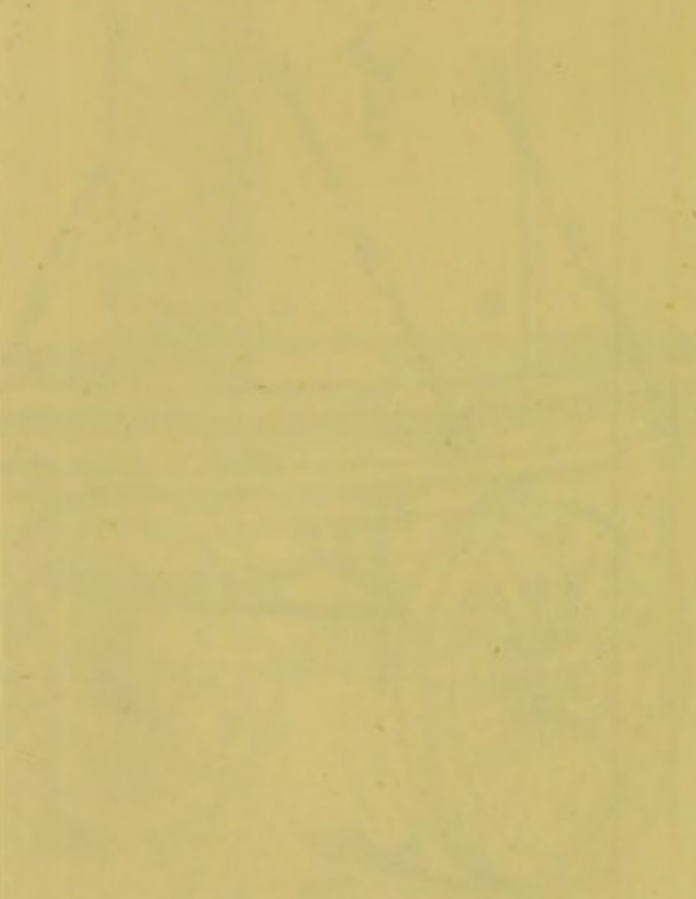


TROLLY FOR CONVEYING CONDEMNED MEAT TANKS TO WHARF.

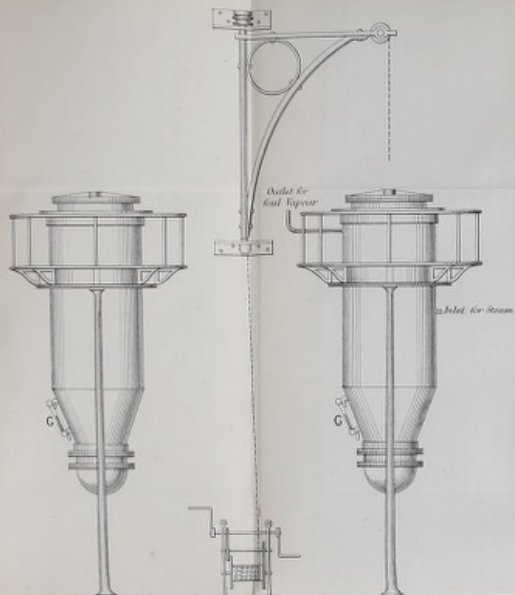


TO CARRY 5 TONS — COST ABOUT £45.

THEORY OF THE

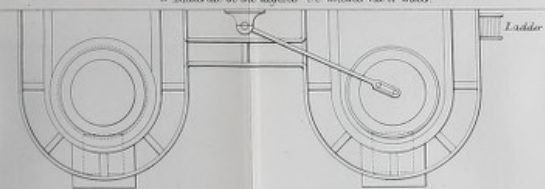


OF THE



Scale $\frac{3}{8}$ to one foot
FRONT ELEVATION.

G Gauge Glass to show the nature of the lower layer of Material in the digester i.e. whether fat or water.



Ladder

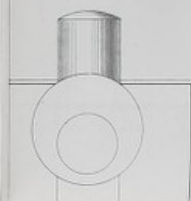
60' 0"

28' 0"

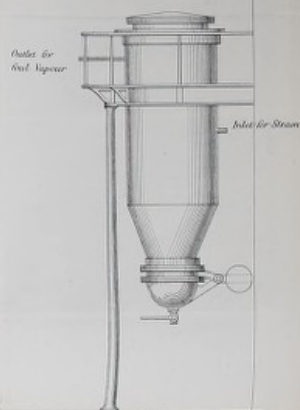


Fuel steam is never here to be burnt by the digester

Scale $\frac{1}{4}$ to the Foot
PLAN



Scale $\frac{3}{8}$ to one foot
SIDE ELEVATION.



Inlet for Steam

