"The Merz-Process"

For Disposing of Refuse Vegetable and Animal Matter.

THE MERZ PROCESS

FOR

Disposing of Refuse Vegetable and Animal Matter

OWNED, INTRODUCED AND IMPROVED

BY

THE MERZ

UNIVERSAL EXTRACTOR & CONSTRUCTION CO.

788 BROADWAY, NEW YORK,

(Formerly of Buffalo, N. Y.)

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OFFICERS OF

THE MERZ UNIVERSAL EXTRACTOR & CONSTRUCTION CO.

LOUIS FLEISCHMANN, President.

GUSTAVE FLEISCHMANN, Vice-President.

W. GREVEL, Secretary and Treasurer.

DEDICATED TO THE

American Public Health Association

SANITARIANS AND LEGISLATIVE BODIES

GENERALLY.

GENTLEMEN .

One of the most important problems before the medical fraternity, and more particularly those members thereof recognized as sanitarians throughout the civilized world and especially in this country, is undoubtedly that of properly and effectually disposing of the refuse vegetable and animal matter of cities.

The points involved may be confined to two, being those of sanitation and economy. It would not become us to praise our own system and to claim for ourselves the solution of this all-important question—hence we refer to mostly unsolicited expressions of recognized authorities on sanitary matters appended to this pamphlet—but it is with just pride that we point to the progress we have made during the comparatively brief period of our existence, and submit for your perusal a concise explanation of our system and its operations, trusting that it may tend to enlighten those still unacquainted with our methods and desirous of recommending to the public at large and in their communities only "THE BEST."

When we started our parent plant at Buffalo, N. Y., it was in the sanguine hope that we might give the public more effective service and relief from a great health-imperilling nuisance—that of dumping refuse vegetable and animal matter into low lands or surrounding water-ways—at even less cost to the community than of old. In this we were mistaken. We had no direct contract with the city and the material delivered to us by the contractor was insufficient in quantity and too poor in quality to even cover running expenses of the plant. The same condition of affairs prevailed at Chicago, where a plant was built on speculation, which failed, also for want of material sufficient to even approximately cover expenses. That neither plant failed because it was not a sanitary success is plainly proven by opinions Nos. 1 and 2 hereinafter following, setting forth the views of Health Officer Clark of Buffalo, and Commissioner of Health Oscar DeWolf of Chicago, expressed in the year 1888, and the explanation given to the St. Louis Committee on Sanitary Affairs by Hon. Chas. F. Bishop, Mayor of the City of Buffalo, of recent date.

It may not be amiss to state here, that without an adequate compensation for the service rendered and a sufficient supply of material, collected under stringent ordinances relative to the separation of refuse vegetable and animal matter from *all* substances and articles foreign thereto, experience has taught us the folly of introducing into communities, whether large or small, our system, though expensive, but lasting, effective and devoid of all objectionable features, save the inevitable, which is in the hauling of the material to the works, but not self-sustaining, al-

though in the long run much less expensive than any system designed only "to destroy."

While theoretically perfect in its conception and construction, our system in its infancy proved defective in some essential points—points to be detected only in the course of practical operation, amongst which was prominently, though only temporarily, that of proper condensation. The gases from garbage, as such, or material principally consisting of vegetable matter, would readily condense in water and become completely destroyed by means of conducting them through the furnace before going into the air, but for the combined gases from vegetable and animal matter, with the latter in preponderance, that method of condensation and destruction proved inadequate. Several plants where large quantities of animal matter were to be disposed of suffered from the defect referred to. A simple system of cylinder and retort combination was first introduced by our mechanical engineer at the plant operating under our system at St. Paul and proved a perfect success as certified to in the letter from Health Commissioner Hoyt of St. Paul, reproduced on page 46 of this pamphlet.

With an improved method of receiving, pressing, drying, extracting and grinding, set forth in the "Explanation of the Merz Process" following, we feel confident of having achieved a degree of perfection and merit unapproachable by any other method, and of having become worthy of recommendation on the part of sanitarians as individuals and as a national representative body, "that the 'Merz Process' for disposing of refuse vegetable and animal matter is 'THE BEST.'"

Most respectfully,

THE MERZ UNIVERSAL EXTRACTOR & CONSTRUCTION CO.

No. 788 Broadway, New York, Dec. 1, 1890.

EXPLANATION

OF THE

IMPROVED AND PERFECTED OPERATION

OF THE

MERZ PROCESS

BY

F. G. WISELOGEL,

MECHANICAL ENGINEER

OF

MERZ UNIVERSAL EXTRACTOR &
CONSTRUCTION CO.

THE IMPROVED SYSTEM FOR DISPOSING OF

Refuse Vegetable and Animal Matter of Cities.

OWNED BY

THE MERZ UNIVERSAL EXTRACTOR & CONSTRUCTION CO.

OF

788 Broadway, New York,

(FORMERLY OF BUFFALO).

Consists :

I.—Of a series of iron tanks of suitable size and form, and set into the upper floor of a building for receiving all refuse vegetable and animal matter, except dead horses and cattle.

These tanks are made steam-tight, with a movable top or hood, and a ten-inch iron pipe is attached to the upper end of each tank and connected with a large suction fan, and the exhaust of the fan leads to a cast-iron condenser, where all the gases and vapors are subjected to a series of shower baths, and such gases that do not readily submit to condensation with water at the ordinary temperature, are blown from the condenser into suitable retorts walled into the fire-box of the boiler furnace, and there superheated, and from which they issue at a red heat directly into the fire of the furnace for final destruction.

The material is dumped directly from the collecting wagons into these receiving or storage tanks. A certain amount of water in the bottom of each tank is heated to boiling before the material is thrown in, and as soon as the material is thrown in, the hood or top is promptly closed down, and steam is turned on at the bottom, the fans taking all gases and vapors as fast as they are given off, and driving them through the condenser and retorts as explained ; thus destroying all disease-germs that may be in the material or vapors emanating therefrom. There is no possible chance for any gases to escape after the material is got into the tanks, because all pipes and joints are air-tight.

II.—After the material has been properly steamed, it is drawn off at the bottom through valves, into close iron conveyors who convey the material into a crusher, where it is reduced to a uniform pulp, thence into a press, by means of which as much moisture as possible is pressed out ; thence it

passes in closed elevators to the dryers, and is thoroughly dried in steam jacketed cast iron cylinders, provided with rotating agitating shafts, that keep the material constantly stirred up during the process of drying. The vapors and gases emanating from the dryers, as well as from the conveyors, crushers, press and elevators are promptly removed by the suction fans, through tight iron pipes to the condenser and retorts for final destruction.

III.—After the material comes from the dryers it contains less than 8% moisture, and it is subjected to a low-pressure benzine treatment in the Merz Universal Extractors, which are iron vessels of suitable form and size, which, after being filled with the dried material, are closed and sealed air and gas-tight for about six or seven hours ; the resultant solution of grease is drawn off into other vessels, the extractor opened and the material discharged free from all noxious odor or dangerous germs.

IV.—The dead horses, cows, &c., are hoisted into a closed room immediately upon receipt, the doors tightly closed. and the animal promptly skinned, cut up and thrown into an iron pressure tank, partly filled with water. The tank is tightly sealed and steam turned on, and allowed to stand under pressure until the entire carcase is thoroughly cooked, when it is dumped into one of the receiving tanks, and follows the treatment of the other material as described. A suction fan is attached by suitable pipe to the skinning-room, and draws all odors, &c., from this room, and blows them into the condenser as the other gases. The pressure tanks are also connected by suitable pipes with the condenser, so that all the gases, vapors, &c., are blown directly into the condenser from the tank. The floors are thoroughly cleansed with boiling water after each operation, and this wash goes into the receiving tank below, so that if any germs should be among the wash they will get the benefit of the boiling water in the tank.

V.—The steam heating the dryers is first passed through a superheator and heated to about 450 to 500 degrees Fah., so that the temperature in the dryers will reach about 450 degrees Fah., while that in the receiving tanks will average perhaps 280 degrees Fah., making sure to destroy all animal life.

Some of the advantages claimed for this system over that of cremation are :

1st. Because any escape of noxious gas, foul odors, or disease germs is effectually prevented.

2d. Because no material of any kind is allowed to lie about or exposed to the air, but it is immediately put into air-tight tanks and is at once out of sight, and its power to do harm wholly averted.

3d. Because in the Merz system of purifying the several gases by both condensation and incineration, they are rendered absolutely harmless, and all disease germs of whatever nature are effectually destroyed without danger or annoyance to the employees or persons living in the neighbourhood of the works.

4th. Because in cremating refuse vegetable and animal matter in a furnance, great heat is required to burn or cremate the wet and fermented organic matter, and it is impossible to thoroughly decompose *all* the gases, such as the ammonia, carbonic acid gas, &c., by merely passing them through fire or a heated chamber and out of the stack into the open air. The gases simply become superheated, and pass out of the stack without losing any of their noxious or disease creating properties, which are regenerated by the colder air, greatly to the detriment of smell and health of those who must breath it.

5th. Because in the Merz system all the solid matter is preserved for various uses, and has an intrinsic value, while in cremation *all is destroyed.*

6th. Because from a sanitary standpoint the Merz Process absolutely provides against the danger of escape of any disease breeding germs, by reason of stopping or chocking of fires from any cause, or by the cooling of the combustion chambers, because in the Merz Process this contingency is guarded against by providing more than one condenser and retort, so if one fails another is at hand.

7th. Because of less cost per ton for reduction of raw material.

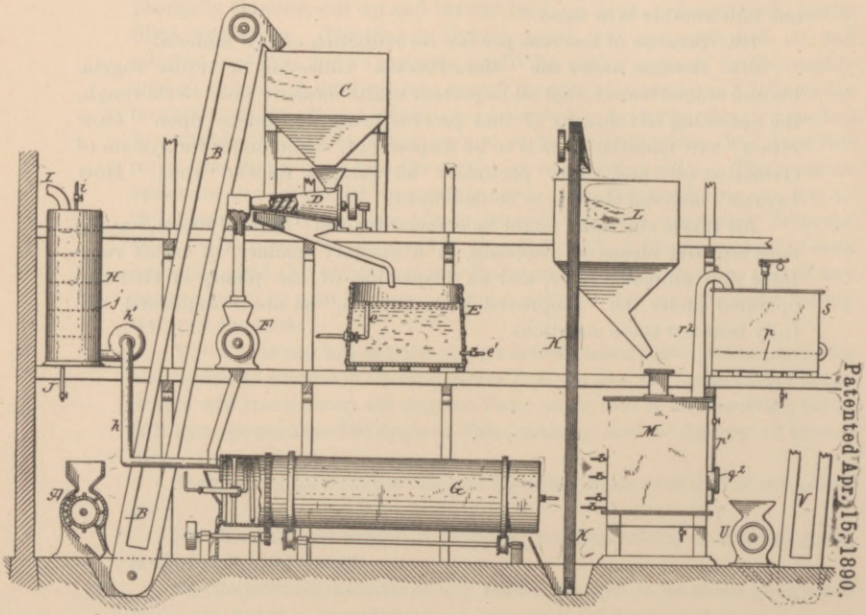
8th. Because under the "Merz Process" collection of refuse vegetable and animal matter, that all-important health measure, must be thorough, the operating advantages of that process being dependent upon "How Much" raw material there is to be disposed of, while under the system of cremation all and every pecuniary advantages depend upon "How Little" material there is to be destroyed.

All this is and more might be claimed for the "Merz Process," as the most effective means of disposing, in a sanitary manner, of refuse vegetable and animal matter, and an inspection of the plants erected and operated under the "Improved Merz Process," as above explained will fully bear out these assertions.

THE MERZ PROCESS,

Illustrating in general the Modus Operandi

(The new feature of Receiving-Tanks omitted.)



OPINIONS

RENDERED BY

PROMINENT SANITARIANS

AND

HEALTH OFFICIALS

RESPECTING THE RELATIVE MERITS OF

"The Merz Process"

AS (IN SOME INSTANCES) COMPARED WITH OTHER METHODS OF MECHANICALLY DISPOSING OF REFUSE VEGETABLE AND ANIMAL MATTER.

From report of Health Officer Clark of Buffalo, N. Y., concerning the Merz System for the disposition of garbage.

"I have visited the garbage extractor works, built by THE MERZ UNIVERSAL EXTRACTOR AND CONSTRUCTION COMPANY, at different times in company with Health Officials from other cities, and each time that I visit the establishment I am more and more impressed with the wonderful system. I have observed and studied into the merits of garbage crematories in other cities and personally I am thoroughly convinced that ere long the method in use here will almost entirely displace them. The destruction of garbage by fire was well enough so long as no better methods could be employed, but since the discovery of the "Merz" method for treating garbage, intelligent sanitarians have something at their command which commends itself as being clean, economical and thoroughly scientific in every sense of the word. I regard this method as nothing short of a sanitary revelation, and I sincerely hope that my praise of it may induce other cities to give it a trial and become convinced of its true value as a sanitary and scientific invention."

Views of Dr. Oscar DeWolf, Commissioner of Health of city of Chicago, given to press representatives at Buffalo, Oct. 26th, 1888.

Health Commissioner DeWolf holds a position in Chicago which gives him control of the great health and sanitary interests of that city. He desired to obtain information concerning the working of the crematory, for use in discussing the "Disposal of Garbage," which will be one of the most interesting topics considered at the meeting of the American Public Health Association to be held in Milwaukee on November 19th.

It is well to state that in Chicago garbage is burned and none of the product is utilized as is done in Buffalo. Dr. DeWolf was seen by a reporter for *The Express*, and he talked interestingly of the problem of disposing of garbage.

"The disposition of garbage has always been to the Health Officers of this country the great obstacle in the way of a proper and efficient administration of their duties. When garbage is dumped into the ocean, as at Boston, it is supposed to be properly disposed of. But in the interior cites its disposal is a more intricate problem."

"Now," continued Dr. DeWolf, "while I've been an ardent advocate of the destruction of garbage by fire, I have never regarded this method as the ultimatum or the final settlement of this problem, because it was apparent enough that we were destroying that which some day would be

recogn.zed as valuable by which I mean that every scrap of paper, of cotton or wollen fabric, old rubber, hoop-skirt, broken glass, tin cans, all have a certain value when separated and properly utilized. I never had any doubt that the day would come when the utilization would appear as an accomplished fact. I have not believed, however, that sanitarians were so near a realization of this desirable result.

"My visit here to-day has been a revelation to me. I find here a plant which utilizes to the utmost extent everything which has value in this daily accumulation of the nastiness of a great city, and it is accomplished with absolutely no offense to the neighborhood so far as the manufacturing processes are concerned. The material is deprived of its moisture by hermetically-sealed dryers, the oil which the mass contains is extracted and it has a commercial value, and the mass, minus water and oil, is a fertilizer useful wherever agriculture is found. I regard it as one of the most interesting sanitary experiments to be found in this country. I believe also that the discussion of garbage crematories has had its day and that we are passing into a new epoch in the settlement of this great sanitary question."

Health Commissioner DeWolf was positive in his belief that the Merz system was one of the greatest inventions in the world, and predicted that in less than a year every prominent city in America would adopt the plan.

BUFFALO, N. Y., Nov. 26, 1890.

H. A. GUINZBURG, Esq.,
St. Louis, Mo.

Dear Sir.—The Hon. Charles F. Bishop, Mayor of Buffalo, has handed me for reply your letter of inquiry concerning our experience with the Merz process of disposing of garbage. The works here are now closed because the company has been unable to continue at a financial loss, but for a year and a half they were in successful operation from the sanitary point of view.

Our Board of Health made several visits to the works while in operation and their entire satisfaction with the process is a matter of public record.

Personally, I have observed the method employed by nearly all the large cities in disposing of garbage, and believe the Merz process to be superior to any other with which I am acquainted.

Yours truly,

(Sig.) F. P. VANDENBERGH,
Chemist to City of Buffalo.

Report of Col. S. A. Whitfield, Commissioner of Public Affairs of Cincinnati, Ohio, on the disposal of garbage, made to the Board of Public Affairs, Dec. 15th, 1888.

"Hon. Board of Public Affairs, Cincinnati, O. :

"GENTLEMEN.—The question of the best mode of disposing of the garbage of our city has commanded the attention of your Board from time to time, and various expedients have been suggested, all of which seemed more or less impracticable.

"More than a year ago, when on a visit to New York, I was directed by your Honorable Board to examine and report upon a garbage furnace or crematory, reported to be in operation at the foot of Seventeenth street, on East river. I did so, and found that although upwards of $27,000 had been expended on the plant, it was, according to the admission of the proprietor, a failure.

"Since that time several others located in different cities have been reported as being in successful operation, and, by resolution of your Board, I was directed to examine them and report upon the feasibility of establishing a plant at some point in our city most inaccessible to the sullage boat (located near the mouth of Mill Creek), should its cost and the sanitary excellence of its work seem to justify the expenditure of a moderate amount of money.

"Having heard and read favorable reports of the new Merz, or Vienna system of disposing of garbage, in operation in Buffalo, I determined to visit that city first.

"Upon arriving there I called at once on Health Officer Dr. Clark, who kindly offered to accompany me to the works, located at Cheektowaga, just outside of the city limits. It seemed that the prejudice against anything bearing the name of garbage had forced these works a long way out, the distance from the City Hall being, I should judge, not less than five miles, and necessitating a very long haul.

"I found the plant in active operation and the system entirely different from anything I had read any account of. The garbage, upon delivery at the works, is placed in a long iron cylinder or boiler, called a 'dryer,' and capable of holding about three tons; this cylinder is inclosed in another termed a jacket, exactly similar in shape, but large enough to leave a considerable open space all around. When filled, the opening to the interior cylinder is closed, and the cap placed on the manhole covering the opening to outer cylinder or jacket through which the garbage passes into the interior dryer. Steam from the boilers, located in an adjoining building, and of about 250 degrees Fahrenheit, is then turned into the open space between the dryer and the jacket. The garbage remains in this dryer and subjected to this steam heat from six to eight hours, a period found long enough to expel the moisture or liquid found in all garbage, varying from 60 to 65 per cent.

"The vapor generated by the heat acting on the liquid portion of the

garbage is forced violently out into a column still containing a succession of perforated plates and filled with cold water.

"The condensation of the vapor is very rapid, and it passes away from the discharge pipe, or, in distilling parlance, the tail of the worm, in the shape of a moderately cool, entirely colorless water, having about the odor of water in which vegetables have been boiled—a little more perhaps than potatoes and less than cabbage.

"At the expiration of the period heretofore mentioned the dried garbage is removed from the dryers and carried by conveyors or elevators to the floor above, where it is placed in vats, called 'extractors'; these extractors, when filled, are covered with iron plates, bolted strongly down, the contents are then subjected to the action of benzine and certain chemicals, not disclosed, which are fed into extractors from a vat elevated a few feet above them. The action of these materials, combined with the steam heat again applied, separates the oil or grease contained in the dried garbage, which is drawn off from the bottom of the extractors. This oil or grease has, when drawn off, something of the color of crude petroleum, but in cool weather soon hardens to the consistency of lard, and has then a dark brown color and very little odor.

"The garbage is then drawn from extractors and conveyed to a drying room having a thin iron plate floor and surrounded by steam pipes.

"The garbage remains in extractors from ten to eleven hours. Each extractor has about the capacity of three dryers.

"The establishment I visited had two dryers and two extractors: additional dryers are now being manufactured, and the plant when completed will have a capacity of about forty-five tons of ordinary garbage per day.

"The oil, or grease, was at the time of my visit being subjected to various experimental processes, and much of it had been refined until it presented the appearance of ordinary lard, perhaps a little darker in color, but free from offensive odor.

"A very large number of barrels of grease were lying in the yard, and the quantity indicated that garbage is unexpectedly rich in fatty substances, and that the process of extracting it must be complete and thorough.

"The principle underlying this new process, and as it appears to me, distinguishing it from all other known processes of treating garbage, consists in disposing of the noxious gases by evaporation and condensation, and then the removal of all organic matter by the chemical process to which it is subjected in the extractors. The completed product, when finally placed in the drying room, is dark brown in color, considerably finer than ordinary ground tan-bark and comparatively odorless. It is sold to fertilizers upon the basis of weight, and a chemical analysis showing the amount of ammonia and other valuable properties it contains. It finds, I fancy, a ready sale, as not more than five hundred pounds were found on the premises. A distinguished chemist informed me that the completed

product would not ferment heat or give out any noxious or offensive odors if dumped on any street, and would form a fill as safe and free from danger of disease as an ordinary dirt fill. The odor inside the factory is not unpleasant—a great deal less than a candle or soap works of latest and most improved construction. There are faults in the practical arrangements of the work largely incident to the fact that the contractor for removing the city garbage has no 'dump' wagons or carts (at least I saw none), but is compelled to shovel all the garbage out by hand.

"Dr. DeWolf, the distinguished Health Officer of Chicago, visited this plant and speaks of it in high terms. He has given permission for the construction of a similar one in Chicago, and an old distillery located on Archer avenue, on the West Side, is now being remodeled. A glance at the map, or a knowledge of the location, will show that this is in a populated district. No one who knows Dr. DeWolff will believe that he will show any mercy if they 'create a nuisance.'

"Dr. Clark, Health Officer of Buffalo, a most intelligent and capable officer, speaks of the new plan in enthusiastic terms and gives it his hearty approval.

"He called my attention to the important fact that the immediate necessity for the construction of some system in Buffalo arose from the fact that a permanent restraining order was issued recently forbidding the dumping of garbage into the Niagara River. The point heretofore used was about two miles below the intake of the Buffalo Water-works, and when it is remembered that the current at this point is not far from seven miles an hour, and very rapid all the way until it takes its final plunge over the falls and then goes tearing along at racehorse speed, it would seem that it is about time to hang out the danger signals in cities dumping into comparatively sluggish streams having along their banks a population to which that along the Niagara River is insignificant.

"I find the Merz system has attracted very general attention, and has been visited by representatives of public bodies from nearly every large city in the country.

"Were it not that the system does not destroy but converts the garbage into valuable commercial commodities, it would unquestionably be very expensive. The machinery is somewhat costly, and a good deal is required. It will, however, not burn out and require replacing, as in the ordinary garbage furnaces. It is not more destructible than ordinary machinery.

"I submit for your inspection samples as they come from the dryer and extractor, and also a sample of the water as it comes from the condenser.

"The completion of my examination of this plant left for consideration the Mann, DeRyder, Kilvington, Engle and Gray Furnaces. Some of these, though excellent in theory, and in practice in a small way, did not seem to warrant the time and expense of a personal visit, and I determined to visit Chicago and Milwaukee and examine the furnaces at those points, about which flattering reports had reached us through medical magazines and other sources.

"On reaching Chicago I called on Dr. DeWolf, Health Officer, but to my great regret found he was not in the city. I then went to the garbage furnace, located on the edge of an extensive stone quarry, near the junction of Indiana street and Western avenue, and in the extreme north-western portion of the city—at least, the extreme portion inhabited. I found the Mann furnace in operation here, and the result of my examination was, on the whole, disappointing. It is an ungracious task, and perhaps a hazardous one, to say anything in criticism of a furnace about which so many good things have been said by so many good men and recognized authorities. It is, however, the great privilege or the humblest American citizen to entertain and express an opinion, and while I have the highest regard for Dr. DeWolf's scientific attainments and long experience in sanitary matters, I have too much respect for his practical good sense and business capacity to believe that he will ever construct another furnace of this character in Chicago, or that he would permit this one to be duplicated in any reasonable thickly populated portion of the city.

"The location of the furnace is admirable, except that it necessitates a very long haul. The furnaces are placed at the bottom of the excavation made by quarrying stone, and the building surrounding and covering them has its flat roof almost flush with the street, and upon this roof the teams drive and unload their contents into one of the twelve chutes leading down to the floor nearly level with the furnace doors. The building covering the furnace is about ninety feet in length. Through the center rises a chimney one hundred feet in height. (The height of this chimney is the best feature of the concern, and conduces most, I should think, to the enjoyment of life in the neighborhood). There is a double furnace with coal fire at the extreme ends, and a strong draught causes the flame to rush fiercely over the garbage that is placed in the furnace. Each furnace is about twenty-two feet in length, eighteen feet in height and sixteen feet wide. They contain, I am informed, about thirty-two thousand fire brick. One of these furnaces was about to undergo repairs, having probably yielded to the great heat to which it had been subjected.

"Perhaps my chief disappointment grew out of the manner in which the garbage was hauled, which on the day of my visit was exactly as follows: A wagon drove up to one chute and two men began to unload it by shoveling the contents into said chute, stopping at frequent intervals to throw a shovelful of some substance over the edge of the building into the deep quarry below. I asked if they did not dump at once into thes chutes, and they said, 'No, they shoveled it in.' And this reminds me that I did not see either in Buffalo, Chicago or Milwaukee a single wagon so constructed as to dump its contents—the very first requisite, it would cem, for a garbage wagon. They may have some but I did not see them

"Going down a couple of very straight ladders we reached the base of the crematory, and after long and loud knocking were admitted to the inside. On examining to see how the furnaces were fed I found a man with the ubiquitous shovel busily engaged in shoveling in the garbage that

had come down the chute and accumulated in a large pile on the floor. I am certainly not hypercritical when I say the inside of this building was filthy. Black, slimy liquid dripped from the sheet-iron pans, placed about six feet from the floor, to catch the oozings as they came from the wagons above, through cracks in the floor, and at the lower end of the building, at the outlet of the pans, a considerable quantity of this concentrated essence of nastine-s had collected.

"The ashes were being drawn out, or had just been drawn out from under one of the furnaces. The consumption was by no means perfect, and the sample I examined certainly contained organic matter that would become more or less offensive when deposited on a dump. I examined several other samples after going out, and found some of them to be of a similar character. I am not mistaken when I say that the odor of the dump at this furnace is as objectionable as that at our city dump at Eighth street, where complaint is made that garbage and ashes are sometimes mixed. What the furnace might do under the most favorable conditions I would not presume to state from so brief and cursory an examination, but that it can never achieve practical business results under the present system of feeding and handling the garbage I think I can state. The garbage of a great city can not be fed into a furnace shovelful by shovelful, let alone repeating this process in emptying it into a chute that carries it within reach of the furnace. I can not say what the effect would be of dumping a load of two cubic yards of garbage (about what one of our city wagons holds) into one of these furnaces, and even the experiment could not be tried as the furnace is constructed; but the presumption is strong that it would be disastrous, or certainly some less primitive arrangement would be devised for feeding them.

"It is claimed that, by running night and day, one hundred and fifty tons of garbage could be burned in this furnace. I can not, of course, controvert the statement, but my judgment is strongly against the accuracy of the estimate.

"The furnace cost, I am informed, $11,000. I could not, from my present information and observation, conscientiously recommend the expenditure of a like sum by this city in the construction of a similar plant. Not less than four would be required to burn the garbage of this city in the event of our being cut off from dumping in the river.

"The expense of consumption after delivery to furnace is variously estimated at from seventeen to twenty-nine cents per ton. It is perfectly safe to say that the cost of consumption in this city for at least six months in the year would not be less than $50 per day. I do not mean to say that the Mann furnace in use in Chicago is not a great advance over the old system of dumping in running streams, vacant lots, on the outskirts of cities, feeding to hogs, or, worse yet, making fills and streets, and thus handing down a legacy of disease to posterity; but it does not, in my judgment, make that speedy and effective disposition of garbage that is imperatively demanded by the growing necessities of great cities.

"The next and last point visited was Milwaukee. There are two furnaces at that place; one was in active operation. It differed somewhat from the Chicago furnace in the application of the heat, which appeared to be from directly underneath instead of being carried over the garbage.

"There was in addition a cupola containing steam pipes, and into this cupola the garbage was elevated and subjected for some time to the heat, applied for the purpose of drying out and evaporating the moisture. But here, as at Chicago, there was an utter lack of effective handling of the garbage.

"The everlasting shovel seemed to be in prime demand. The garbage was shoveled from the one-horse wagon into the elevator, which carried it to the cupola. It would certainly seem that after having been dried it should have been fed from this cupola by the chute directly into the furnace; instead of this, however, it was passed down the chute on the floor into a heap, and at the time of my visit a man was engaged in feeding it into the furnace a shovelful at a time. The destruction of the garbage in this furnace, as indicated by the samples of ashes I examined and by the appearance and odor of the dump where they were placed, seemed to be superior to the work done by the Chicago furnace; the ashes were finer and there were fewer 'clinkers' or large masses of 'matter fused by heat but not disintegrated.

"The second furnace was not in active operation at the time of my visit, and I was informed that it had been disposed of to The Merz Extractor and Construction Company of Buffalo, who propose introducing their system in that city. I did not, therefore, examine it carefully, but noted a great improvement in the way of feeding, which was by driving up an incline to the top of the furnace and feeding directly into it. The character of the wagons used in Milwaukee would necessitate shoveling into the manholes or openings on the top of the furnace, but this would be the fault of the wagons and not the furnace.

"The question of the escape of noxious gases by the destruction of great quantites of garbage by fire is one I do not care to discuss. The confident assertion of the several inventors that there is such destruction is not sustained by the great height to which they carry their chimneys, or else their confidence is not shared to a great degree by the Health Officers and the communities where the furnaces are built. That many of these furnaces work well on a small scale there can be little doubt, and they will be utilized in many places with profit to the public.

"When any furnace can be found that will receive at once the contents of a cart or wagon holding from one and a half to two cubic yards of ordinary garbage—equal to about one and a half to two tons weight—as often as the necessities of the city demands, and turn that garbage out in the shape of clear, clean ashes, I am ready to shout Eureka! louder than anybody; and if the Health Officer of our city will certify that there is no danger from the escaping gases, I will earnestly recommend to this Board its immediate adoption.

"All wagons or carts should be constructed so as to dump their contents promptly; when emptied, should be flushed thoroughly with water, in which might be mixed some cheap form of disinfectant or deodorizer. A long suffering public would be gratified, if not benefited, by seeing garbage wagons and carts pass through the streets with their contents carefully covered, and return for fresh loads without offending one of the most valued senses.

"A non-absorbing, steel-bodied cart, carefully covered, is no doubt the best adapted to hauling garbage, and they are being used in New York with much satisfaction to the city officials and the public.

"The Merz or Vienna system seems to me a great advance over the furnaces, and I shall be able in a few days to submit for your consideration a proposition from the proprietors for the erection of a plant that it is hoped will permanently relieve a populous portion of our city that will otherwise I fear, suffer inconveniences and discomforts by reason of its long distance from the sullage boat.

"It will of course be required that the crudities of handling the garbage as delivered at the Buffalo factory shall be remedied.

"The dryers are capable of receiving at once three tons of garbage and closing it at once from all contact with the air, and there is no reason why it should not be done."

From report of Dr. Horlbeck, Health Officer of Charleston, S. C., made to Board of Health of Charleston, Jan. 23d, 1888.

"We now come to a problem which is occupying the very serious consideration of the American sanitary world, and that is the disposal of garbage.

"Dr. Kilvington, of the Minneapolis Board of Health, read a very full and comprehensive report of the methods of destruction now in use. He characterized the present as the era of filth formation and strongly advocated the necessity of an old-fashioned gehenna for every modern city. Dr. Kilvington described the workings of several methods now in use.

"Commencing with the Mann crematory now in successful use in Montreal and Chicago, I visited the one in Chicago, and found it in active operation. It is in condition to destroy by fire 100 tons of garbage every 24 hours, and costs the city about 23 cents a ton; it consists of a furnace, and the garbage is subjected to an intense heat, which destroys it pretty effectually, dense volumes of black smoke escaping from a high chimney. The furnace is situated in a deep lime pit, and the garbage is thrown into the holes above with great facility. It was not very cleanly, and there was some odor of an unpleasant nature. Dr. DeWolf, Health Commissioner of Chicago, informed me that it was a great boon to the city, and had been in successful work for the past twelve months. It has cost about $13,000, but a similar one, he thought, could be put up for $9,000,

and were there not a better one offered he would continue the use of this one, and perhaps have others built.

"The next furnace was described as the Engle patent. This one has been in use in Des Moines, Ia., and at Minneapolis, and at Milwaukee there was some improvement designed by Dr. Kilvington. These furnaces were described as entirely satisfactory, destroying garbage, offal, street detritus, etc., etc. Recently sixteen horses had been thrown into the one at Minneapolis and were rapidly consumed, the cost was about twenty cents a ton, and the cost of erecting a furnace in Charleston would be about $6,500.

"The Ryder furnace is in use in Pittsburg. It has not been entirely satisfactory, as the cost of consuming the garbage with fuel at a minimum low figure was between twenty-five and thirty cents a ton.

"At the conclusion of the paper, Dr. DeWolf, of Chicago, remarked that while he had believed in, and was still practicing the destruction of garbage by fire, a process that might be fairly defined as an economy of extravagance, he had been recently converted to the truly economic, yet sanitary, disposal of garbage by the Buffalo system, which was described by Health Officer Clark, of that city, as a complete and perfect method of garbage disposal at no cost to the city except the placing of it at the designated point. I was so much pleased with the report made that I determined to accept a kind invitation from Mr. Fleischmann, who patented the method, and who brought the idea from Vienna, where it is known as the Merz method, and accompanied him to Buffalo, where the whole business was seen.

"It would be too difficult for an unpracticed hand to describe the machinery in detail for this most admirable scheme, but suffice it to say that the garbage is received in a room with several holes which communicate with two long iron cylinders or boilers with a shaft running down the long diameter, with hollow rakes, through which is introduced superheated steam, entirely drying the garbage; as soon as this is effected the garbage is received into an iron tank, and, by means of benzine, the oil is separated from what is known as tankage.

"The result of the process is a merchantable grease or oil, and the tankage is a valuable commercial fertilizer. In this process the ammonia is retained as well as potash, phosphate lime, etc.

"I cannot leave this subject without strongly urging your earnest consideration in this direction, viz.: the rapid and early removal of our garbage from the streets. As at present arranged there is a long and costly haul to a point destined at no distant period to be occupied by human habitations, and while the necessity is upon us now and we are obliged to do the best one may, it is incumbent to utilize every modern scientific resource at our disposal. With the Buffalo method we can place the crematory or garbage receiver at almost any point within the city limits."

"During a recent trip to Buffalo in the capacity of Medical Health Inspector of Toronto, I had the pleasure of visiting the premises lately erected there for the disposal of garbage, and of becoming acquainted with the "Merz system." I am very glad to have the opportunity of saying that after carefully observing all the details, I was forced to the conclusion that the Merz system was more thorough and economical; and at the same time less disagreeable and obnoxious, than anything I had ever seen or read of. There was no bad odor, and as it seems to me to be adaptable to any city and under any possible set of circumstances, I believe the problem of disposing of the garbage and refuse of large cities economically and without offensiveness to the citizens has been solved."

I have the honor to be yours faithfully,

W. LEHMANN, M. D.,
152 Spadina Ave., Toronto, Ont.

To The Merz Universal Extractor and Construction Co.

February 25th 1889.

From Paterson Daily Press, Tuesday, April 22, 1890.

WHAT TO DO WITH GARBAGE.

Paterson's Traveling Committee find the Merz System the thing.—The Crematories a Failure.

Health Inspector Leal, who has just returned from an extensive trip through the West with City Physician Agnew and others, on a tour of inspection of the different systems in vogue there of disposing of garbage in the large cities, is enthusiastic over the Merz or Vienna System, which he says is the only successful one, all others having thus far proven flat failures. A Press reporter this morning had an interesting talk with the inspector. The doctor says that previous to making the trip he had written to the health authorities in the different cities where it was known that garbage crematories existed, and also to the officers of the companies controlling the crematories. Glowing accounts were received from Chicago, Minneapolis, Detroit and other places, concerning the work done by the crematories, and the amount of material they were capable of disposing of daily. The Inspector says that his trip developed one thing, and that is, that there are some very competent liars in these Western cities.

Of the places from which the most glowing stories came about crematories and their work, those from Chicago were the most glowing. The doctor was accordingly anxious to see the plant there, and he visited the Windy City. He had been written that the Mann furnace, which was used there, burned up the garbage at the rate of sixty tons a day, and when he reached Chicago all he could find of the furnace and plant was some ruins of brick buildings.

He was informed that the ruins were the result of the populace rising up in its might and declaring war against the rendering establishment. Following the declaration of war against the stinking institution the estab-

lishment mysteriously caught fire and was burned to the ground and no regrets were expressed over the conflagration. Dr. Leal was informed that the place was a menace to health and unbearable to the nostrils. A greasy smoke was given out from the refuse that settled down upon the buildings in the neighborhood and made the residents in the vicinity wish that they were in almost any other place than Chicago. The Mayor of Chicago, health officers and various citizens that the doctor conversed with on the subject pronounced the system a dire failure.

In Detroit the doctor found that a furnace known as the Patrick furnace had been in use, but at the time of his visit was closed down and had been for some time. The Patrick furnace was an Engel furnace with some alleged improvements that Mr. Patrick had applied to it. Mr. Patrick was a member of the Health Board of Detroit, which had been greatly vexed and tried over the question of what to do with the garbage. The city was in a bad plight and a solution of the question was sought. Mr. Patrick was sent to Europe at the city's expense to inspect the different systems in use there and he also made a tour of many cities in the United States, with the result that when he went back to his native city he made a contract with Detroit, whereby he agreed to make way with the city's refuse in a furnace of his own devising, the result of his studies abroad of the subject. The furnace was an Engel, with a number of improvements constructed by himself.

This furnace and plant were set up in a thinly settled part of Detroit, and its fires were lighted. The odor given out from the place was unbearable, while the smoke was stifling and unhealthy. People began to move out of that section of the city, and finally Mr. Patrick had an injunction served on him restraining him from continuing the business. The city of Detroit then made an effort to make Mr. Patrick move his plant outside of the city limits, but he in some way or other had the city bound in such a way that he could not be forced to move, and it was not until the Aldermen paid him $2,500 that he agreed to take his establishment out of the city. The Patrick system proved a failure—the garbage refused to be burned.

In Minneapolis the Forestal system had been tried; this was also a crematory. Mr. Forestal had a contract with the city to destroy the garbage, but his furnace could not destroy the stuff, and threw out such a stench that it had to be abandoned. A Mr. Kilvington, of the Health Board, had devised a furnace that he claimed would do the work, and the result was that he built one and put it in operation. The furnace was burned for three weeks, when it burned itself out, and to-day the plant stands abandoned. Minneapolis was another city from which glowing accounts had been received. Minneapolis is still dumping its garbage in low lying lots, while the furnace remains closed by an injunction.

The inspector found that all of those health officers who had been foremost in advocating the burning of garbage were now a unit in saying that the stuff could not be burned. The crematories in Chicago, Minneapolis,

Milwaukee and Detroit were flat failures, and highly objectionable on account of the vile odors that were given out by them.

At St. Paul, the doctor found the Merz or Vienna system in operation, and the health officers loud in their praises of its work. This was also the report in Chicago, Milwaukee and Buffalo. The Merz system seemed to afford the only solution to the vexed problem. No objections were found against the system on account of bad odor or anything else. Dr. Leal says that no one would know what the place was if they did not see the carts going to and from it. By this system the first process of disposing of the garbage is to put it in huge dryers, which resemble tanks or boilers. These boilers have two shells. Between these are coils of steam pipes. In the interior shell the garbage is placed and subjected to great heat; inside of this there is also a wheel that resembles the propeller of a steamboat, which, as the boiler revolves, keeps constantly stirring up the contents of the boiler. The stuff is then transferred to a condenser, from which the gases and vapors are sucked out of the material by means of a steam fan-like arrangement. The only refuse left is a fluid that is as clear as water, and this is allowed to run off into the sewers. The non-condensable gases are led off by means of pipes to the fires in the furnaces, and are destroyed there without emitting any odor. The refuse, after a certain number of hours manipulation in this machine, is ready to be placed in the extracting machine, by which the oils and greasy substances are extracted. What is left after this is run through sieves, is ground up and forms fertilizers, and sold.

The Merz system has been in operation in Buffalo, but has not proven a success financially there, because the company did not have a contract with the city to dispose of the garbage. The plant will be opened again soon if contracts are secured with the city. The Committee selected by the Board of Aldermen of this city to inquire into the best method will report in favor of the Merz system at the next meeting of the Board. If the Merz Company can make a contract with the city to dispose of all the garbage, it will erect a plant here, as it is desired to establish themselves in Newark, Jersey City, Paterson and Elizabeth.

CITIES'

COMMITTEE-REPORTS.

Report of a Committee of the Newark Board of Health on the disposal of Garbage, to Common Council of that City.

Your Committee visited in order Chicago, Milwaukee, Detroit and Cleveland.

In the disposal and separation of the Refuse matter different methods are adopted: Some burn, some carry into the lakes and deposit, some bury it, some use it to fatten swine, and two or three have adopted the only sanitary method, The Merz or Vienna system.

At Chicago we visited the Garbage works ("Merz system") without announcing our arrival and found them in full operation. They are located upon the outskirts of a densely populated neighborhood near the lumber districts. We observed nothing but the so called chicory smell upon the outside, and we may say here that we have very many worse smelling places in the centre of our own city. On entering we found a Garbage wagon being unloaded of its reeking mass, which was soon put into a hopper and carried to the dryers. In this we think the process could be improved as well as in some minor details since the construction of the plant. The plant has the capacity of eight dryers five feet by fourteen feet, of 5,000 lbs. capacity each, and, as the process takes eight hours, if worked the entire twenty-four hours each dryer will have the enormous capacity of 15,000 lbs., and the entire plant sixty tons. The result in tankage would be about eighteen tons, worth according to the amount of ammonia it contained from $2.50 to $11.00 per ton, while the yield of oil would be about sixty pounds per ton and worth $2.00 per ton. All this saving from waste. Nothing as the surroundings and conditions existed but what would be satisfactory to the sanitarian. While they operated a Mann crematory in Chicago for the destruction of garbage, we take it that Colonel Whitfield's statement "that while good of its kind it was the consummated essence of nastiness" would hold good; its cost was $11,000 and the cost of consumption after delivery to the furnace from twenty-seven to thirty-seven cents per ton, to say nothing of repairs on furnace which the intense heat quickly destroys.

From Chicago your committee went to Milwaukee. Here until two weeks ago the crematory has been the old method. This furnace, a modification of the Engel by Dr. Kilvington, we find still running, foul and disagreeable, giving off noxious gases felt almost a block around and yet we were told that they were well satisfied when they compared it with their plans of the past, the filling in of low places with the ashes and garbage. Here we found that the city had contracted for the Merz process, paying $15,000 per annum to the company for its disposal, the city to haul to the extracting works. This has been completed to the satisfaction of those concerned, and since our visit St. Paul and Denver have both

given up the furnace system. The next city visited was Detroit, where the Glasgow method and furnace is in use, and just entirely rebuilt and improved. This has been claimed to be the best in use; the fire was intense; through it jets of crude oil were forced which intensified the heat, yet we were informed that during watermelon season the fire had been put out in the old furnace more than once. From Detroit we went to Cleveland. There we found it but partly looked after publicly, the house-holder looking after the destruction. That gathered by the city was removed about eight miles out into the lake and dumped, the Clevelanders hoping to have it carried away by the current. We have always till now been impressed that destruction of garbage by fire was the only process to be recommended by sanitarians. If we should adopt such it would be a great advance on the present plan of dumping on vacant lots, filling ponds and outlying low lands and streets.

Your committee would recommend the destruction of all garbage, and urge the passage of an ordinance requiring the separation of garbage and other material.

They would recommend the Merz or Vienna system, because it is free form all objections from a sanitary point which is not the case with any of the present known methods of destruction. They would recommend the Vienna system because it will be erected and run by a private corporation, and all expense borne by them and would so come under the care and supervision of this department, except so far as the payment of the $15,000 to the company by the city.

Dr. F. B. Mandeville,
Ald. A. H. Johnson,
Tyler Parmley,
Committee.

Extracts from proceedings of the Common Council of St. Paul, Minn., meeting of April 29th, 1889.

Special Meeting.

St. Paul, April 29th, 1889.

President Bickle in the chair.

Present — Aldermen Blom, Bock, Cullen, Conley, Fisher, Gehan, Cavanagh, Leithauser, Minea, Melady, Sullivan, Yoerg, Mr. President —13.

COMMUNICATIONS.

From His Honor the Mayor—Call for the Meeting.

His Honor the Mayor called the meeting for the purpose of hearing, considering and acting upon reports of Special Committee on disposal of refuse matters. Accepted.

REPORT OF SPECIAL COMMITTEE.

Of Special Committee on disposition of refuse matter—Report of results of trip to Buffalo and other cities—

To the Honorable Common Council of the city of St. Paul:

GENTLEMEN—The undersigned, your committee, appointed to investigate and report what in their opinion was the most practicable system and the best method of disposing of the refuse matters, consisting of ashes, night-soil, garbage, dead animals, etc., that accumulate in this city, we beg leave to report that, pursuant to your direction, they proceeded to the cities of Chicago, Buffalo, Boston and New York, and carefully investigated this subject.

Aside from the ordinary method of removing these materials from the city, to some place without its limits, and there deposit them, we found two systems that are now, or have been in practical operation, for the disposal of these materials within the cities, one of which consists in the cremation of the materials and the other is what is termed the "Merz system."

CREMATORY SYSTEM.

The city of Chicago has built a large plant, costing about $70,000, which it has been using to cremate that portion of these materials that it could dispose of in this way, and during the season of 1887 had this plant in active operation. The operation of the plant established the fact that it required a ton of soft coal to burn about twelve or fifteen tons of garbage, and counting the expense of running the plant and handling the material after it was collected, the statistics prove that it required an expenditure of 17 cents a ton to burn this material. The practical operation of this crematory also established the fact that to obtain satisfactory results it was necessary to separate the ashes and incombustible materials from the garbage, and this, in the city of St. Paul, has proved a very difficult undertaking.

This system of cremation has been tried in the city of Milwaukee, but it proved unsatisfactory there, and the city of Chicago has endeavored to obtain another system, and Dr. DeWolf, the Health Commissioner of the city of Chicago, is about to introduce in that city, the "Merz system."

We are unanimously of the opinion that the crematory system would be unsatisfactory, and should not be adopted by this city, namely, for the following reasons: First—It is very expensive; second, in operation, it necessarily throws off gases and creates odors that are not desirable within the limits of the city, and third, it requires the separation of the garbage from the other materials and leaves the ashes, night soil and dead animals to be disposed of by some other method.

"MERZ SYSTEM."

About ten months ago a company of gentlemen under the name of the "Merz Universal Extractor and Construction Company," erected a plant outside of the city of Buffalo, N. Y., for the purpose of disposing of the garbage from that city. The Merz company assured the people of Buffalo that the operation of this plant would not be objectionable in the heart of the city; but the officers of the city so feared its operation that they com-

pelled them to construct it beyond the city limits. This plant has been in operation for several months, and, when we visited it, we found it in active operation. As it is operated at present, it handles and disposes of only that portion of the refuse matter covered by the term garbage ; and this excludes night soil, ashes and manure ; all the other parts of the refuse matter of the city are disposed of by the use of this plant. The mechanical construction of the plant it is not necessary to describe, but the material is treated substantially as follows : It is placed in large iron cylinders, capable of holding about 6,000 lbs. each, within each of which is contained a hollow revolving shaft with hollow arms, which can be, and in operation are, filled with superheated steam. In a jacket around the cylinder and in this hollow shaft and projecting arms is contained superheated steam during the operation of the plant, and the shaft is constantly revolving.

At the end of about seven hours the material is removed from this cylinder. It comes out of the cylinder dry and free from all offensive odors ; and in the operation of drying it in this cylinder all the moisture and organic gases are removed and condensed into water, without the escape of any offensive odors. In this part of the process about 65 per cent. of the green garbage is destroyed or removed, and the remaining 35 per cent. is then taken and placed in close tanks or extractors, in which it is treated with chemicals, and there is extracted from it in vegetable and animal oils about 3½ per cent. of the amount of green garbage, and the bal ance of the material is found to be of considerable value as a basis for making fertilizers. The oil is used for making candles and the material which forms the basis of the fertilzers is of a brownish color, dry and apparently cleanly and without any offensive odor.

As we found this plant in operation there was nothing offensive or annoying to the people residing in the vicinity, or to those employed about the plant. There was no offensive odors whatever, except such as arise from handling of the garbage before it commenced to be operated on in any city or place, and there was nothing in connection with the plant that could be termed a nuisance. A plant like this might, in our opinion, be constructed and operated in very many portions of the city, without the least annoyance to the residents in the vicinity.

At Buffalo we found that there were four of these dryers or cylinders for drying in active operation, and it was estimated that it would require four more to dispose of all the garbage from that city. From the best information we can obtain, we estimate that it would require a plant consisting of four or five cylinders or dryers, with the corresponding extractors, to dispose of the garbage of this city. This system which we have described has been investigated by the health officers of the cities of Milwaukee, Chicago, Cincinnati, New Orleans and Detroit, and since this investigation a plant has been constructed in the city of Chicago, with the permission of the authorities, in a part of the city which is thickly settled and inhabited, and it is now in operation ; but, at the time we visited it, it had not been started. The Chicago plant was the best constructed of any we

saw, and, in mechanical construction, far superior to the one in operation in Buffalo. At the time we visited the Buffalo plant, the Merz company was about commencing to operate another dryer for the destruction of night-soil and manure; but this was an experiment which we understand has been successful since we returned.

We have no hesitation in saying that we think the "Merz system," which we have described, is the best and the least offensive, and the most economical, of any system of which we can obtain any information, for the disposal of green garbage, if it is to be disposed of within the city.

We understand that the Merz Company, or the gentlemen operating it, would be willing to enter into a contract to dispose of this garbage, but we do not know as yet the terms upon which they would undertake it.

The great practical question which the Council has to determine is, how to dispose of all the refuse matter gathered throughout our city, consisting of night-soil, manure, dead animals, ashes and garbage. If the Merz Company can dispose of the garbage and dead animals, of which there seems to be no doubt, we estimate that the night-soil, manure and ashes would still constitute at least 75 per cent. of the whole amount of refuse matter to be disposed of, and that would have to be disposed of in some other way.

In conclusion, your committee would recommend, in order to bring the whole question of the disposal of garbage in a more definite form relative to the cost, etc., that the City Clerk be authorized to advertize for the bids for the collection and disposal of all refuse matter within the limits of the city of St. Paul. Proposals to be made in such a manner that separate bids can be obtained for the collection of all refuse matter and its disposal; for the collection of garbage alone and its disposal, and for the collection of all other matter except garbage and its disposal.

Respectfully submitted,

ANTHONY YOERG, JR.,
O. O. CULLEN,
JOHN F. GEHAN,
Committee.

L. W. RUNDLETT,
HENRY F. HOYT, M. D.
Commissioners of Health.

To the Honorable, the Mayor and the Board of Aldermen:

Your Committee appointed to examine into the different methods for the disposing of garbage now in use in this country, would report as follows:

In the opinion of this Committee, there are only two ways for the disposing of garbage which are worthy of consideration from a sanitary point of view, viz.:

1. Cremation.
2. According to Merz System

Taking up the method of cremation first we would state that after a careful study of all the literature upon the subject obtainable, we determined that the following methods of cremation were worthy of our consideration, viz.: The Mann or Montreal System, the Forestal, the Kilvington or modified Engle, the Patrick, the Engle and the Rider.

The Mann System which was very thoroughly tested in Chicago, under the personal supervision of that eminent sanitary authority, Dr. De Wolf, we found to have been an utter failure.

An examination of the scorched and blackened ruins which are all that remain of it now, shows that the outraged and indignant citizens of the neighborhood who set fire to it in a spirit of poetic retributive justice, cremated the furnace far better than the furnace ever cremated the garbage. The Forestal and modified Engle, which were tried at Milwaukee, under that experienced and conscientious Health Officer, Dr. Martin, failed most signally to do their work, and Dr. Martin, who in his attempts to solve the garbage problem was instrumental in starting them, was obliged to close them up, not only as failures, but as public nuisances as well. The furnace at Minneapolis designed by the Health Officer of that city, Dr. Kilvington—the foremost advocate of cremation, and probably the man best posted upon the subject in this country—is now closed, as a failure and a nuisance.

The Patrick Furnace which was formerly in operation in Detroit has some good features, and we believe that in lack of something better, its use would be an improvement over the method of filling in water courses and low lands with decaying animal and vegetable matter. However, the difference would only be one of degree, as it was such a nuisance to the neighborhood in which it was located in Detroit, that the city was obliged to purchase, at the price of twenty-five hundred dollars, its removal to the grounds of the Small Pox Hospital. Probably the theory acted upon that no one would be likely to go near enough to that neighborhood to be annoyed by the smell. We were also assured by the Health Officer—Dr. Duffield—that the process of combustion was very imperfect, and the apparatus itself a great disappointment. The Engle was seen at New York and at Coney Island and was not at all satisfactory. Complaints of its failure and also of the expense of running it, are coming in from the South where they have established several recently.

The last furnaces examined were at Pittsburg and Allegheny and are of the Rider patent. We have no hesitation in saying that, in our opinion, this is the best furnace in existence in this country to-day. It *will* burn garbage of all kinds and will burn it throrougly, and that is more than, in our opinion, any of the others will do. We put it to the most severe test possible—piled it up full of wet tan bark refuse, ordinary garbage, rotten sauerkraut, pickles, slaughterhouse refuse, etc., then carefully examined the residuum, and found the combustion was almost perfect. The cost of running it is astonishingly low—at least in Pittsburg and Allegheny, where fuel is so plentiful and so cheap. What the cost would be here we are

not in a position to say. The fuel used in Pittsburg is natural gas which costs three hundred dollars per month to burn at least sixty tons of garbage daily. The furnace at Allegheny which burns waste coal is said to cost much less in proportion. There is little odor or nuisance of any kind about the cremator or the premises or in the smoke as one could expect to find. Of course, it must be understood that it is practically impossible to consume garbage in any quantity without some odor and some nuisance about the premises, but in this system it seems to be reduced to the minimum.

This finished the list of the systems of cremation we decided to investigate. To sum up briefly we would state that, in our opinion the Rider System is the best, the Patrick next, and that the others have mistaken their vocation.

In the second place we take up the Merz System. This method we found in operation in the following cities, viz.: Chicago, Milwaukee, St. Paul, Detroit and Buffalo. We critically examined each plant and consulted the Health Authorities in each city in which they were located.

In Chicago, we found a plant capable of disposing of fifty tons of garbage daily. It was situated in a closely built neighborhood, and according to the testimony of neighbors and that of the Health Officer—Dr. Wickersham—there were no complaints of any nuisance. There was nothing about the premises which would lead one to suppose that it was a garbage factory unless they saw the carts unloading, The only perceptible odor was an agreeable one. and it would be hard to find a neater and cleaner manufacturing establishment of any kind.

At Milwaukee the capacity of the plant is thirty-five tons daily. It meets with the full approval and approbation of Dr. Martin, the Health Officer, who after a long and varied experience with cremation feels that at last the difficult problem of garbage disposal is scientifically and satisfactorily solved. There are several improvements in this plant over that of Chicago, and all that has been said of the latter plant may be repeated here.

The St. Paul plant disposes of thirty tons daily to the satisfaction of Dr. Hoyt, the Health Officer.

At Detroit we found the most perfect plant of all, and one on which very little improvement can be made. It is in a very good section of the city and is disposing of thirty tons daily, and meets with the unqualified approval of Dr. Duffield, the Health Officer, who expresses himself as perfectly satisfied with its workings in every respect.

The works at Buffalo were the first ones erected and are hardly up to the standard of the other mentioned, although about the only grounds for criticism there are in the methods of handling the garbage, and not faults appertaining to the system itself. It meets with the full approval of the Board of Health, which takes great pride in the fact that it was the pioneer in introducing this system into this country. Dr. Vandenbergh, the Chemist of said Board, a gentleman of high position and great attainments

in his specialty, has made a special study of the chemistry of the Merz process, and declares it to be scientifically perfect and the one system in the world which can dispose of garbage in a sanitary manner.

This completes the lists of plants of the Merz system inspected by your committee, and we would sumarize as follows:

First.—That these plants can do and are doing the work claimed for them and required of them

Second.—That this work is being done in a thoroughly sanitary and scientific manner.

Third.—That no nuisance of any sort need exist on the premises of these plants, or be incidental to the process.

Fourth.—And therefore that the works may be located at any point the most convenient for the delivery of the garbage.

Fifth.—That this system has the unqualified approval of the Health Authorities in every city in which it is in use.

Sixth.—That most of said authorities have had previous unfortunate experience with other systems.

In conclusion and in performance of the duty for which we were appointed, we would now state to your honorable body that we are unanimously of the opinion that the Merz system is the best and the only perfect sanitary system for the disposal of garbage in existence to-day; and we would recommend that your honorable body relieve us from our greatest evil—and one which is growing worse year by year—by at once adopting this system for our city.

(Dictated.)

Respectfully submitted,

(Sig.) J. L. Leal, A. M. M. D.,
Health Officer.
" C. S. Van Riper, M. D.,
Board of Health " Frank Agnew, M. D.,
" Alderman, Wm. Ryan,
Committee.

REPORTS

TO

THE LADIES HEALTH PROTECTIVE ASSOCIATION

OF THE

CITY OF NEW YORK

NEWARK, N. J., Jan. 25, 1890.

To the President of the Ladies Health Protective Association of the City of New York:

Within the past year the Newark Board of Health has examined the various methods for the disposition of garbage, it being the intention of the authorities of the City to erect a plant for that purpose within a short time. The members have visited the cities of Buffalo, Chicago, Milwaukee, Detroit and Cleveland for this purpose.

All the methods in use at the present time, with the exception of the Merz or Vienna system, cremate the material, destroying it entirely, and this is attended with the escape of noxious gases in more or less quantities.

With the Merz or Vienna system, we have certain constituents of the garbage extracted and its valuable products utilized and rendered commercially valuable. Then by this process no poisonous or noxious vapors are allowed to escape and pollute the air, but are disposed of by evaporation and condensation.

In the estimation of this Board, the Vienna system is the best in use at the present time, and we are satisfied that it is only a matter of time when cities which have no plant at the present time will adopt it, and that those using other methods will abandon them and adopt this process.

I am, very truly yours,

(Sig.) DAVID L. WALLACE, M. D.,
Secretary and Health Officer.

MILWAUKEE, WIS., Jan. 24th, 1890.

President Ladies' Health Protective Association of the City of New York:

Madam.—I have been requested to make a statement regarding the merits and the working of the Merz system of garbage disposal, and I assure you it gives me pleasure to say that, despite the claims of theorists who favor cremation, that the facts are well against them. Probably no city in the country has a more varied experience in the direction of garbage disposal than we have had, while other cities were *talking* of the *best cremators* we were using them, and have a practical experience for more than eighteen months, during which time the entire garbage of the city was cremated.

Of the many plans adopted for this purpose how few are in use to-day and how many of them do the work required of them. I do not know of one that is a sanitary success, true almost any one of them will burn manure and like material, but that is not what is wanted, that is not

garbage, that can be burned at less cost in the open country. When our cremator was replaced by the present Merz system, many feared a nuisance might be created by an industry handling such material and located so near some of the best residences in the city, but all were happily disappointed, and a person who would call at our establishment at any hour of the day or night, would fail to discover anything that could be called a nuisance either to sight or smell. Many of our best citizens have visited the works. Ladies, representing the Eastern Press, have gone through the works, not without fear lest an offensive odor might cling to them, but they too were disappointed and pleased, and all unite in saying that this is the system that will fulfill all the requirements of the sanitarian of to-day.

For myself I cannot say too much in its favor. It has been my fortune to be identified with the question of garbage disposal in this city for more than eight years, and I am gratified to know that at last for us the great question has been settled to our entire satisfaction I have claimed this the crowning sanitary success of our age, and any city that has had a like experience, will, when fully made aware of its merits, gladly welcome it as I have done. The cost is a most unimportant factor, but one that some of our smaller cities seem inclined to consider and to which they attach, I believe, too much importance. The question of dollars and cents in such a matter should be put against the nuisance, and all will find this to be money well invested.

If I can be of any service to you in solving this question, either by answering any question you might wish or even by calling and talking on this subject, much information might be gleaned from the trials we have undergone.

Freemont Hill, C. E., sent by the Mayor of Chicago to inspect and report on our system of *collection* and *disposal* of garbage, writes me under date of December 31, 1889.

"I consider yours one of the most advanced scientific and successful systems in use to day." I shall be pleased to hear of the adoption of the same system in our city.

Yours respectfully,

(Sig.) R. MARTIN, M. D.,
Commissioner of Health.

ST. PAUL, MINN., Jany. 24, 1890.

To the President of the Ladies' Health Protective Association of New York City:

Madam.—For many years the problem of the disposition of the refuse material that accumulates in a city, has proved more difficult to solve than almost any other. After years of experience, experimentation and investigation of many systems and methods, we have finally adopted what we

believe to be the best and most scientific system in the world to-day. It will take your garbage and by a process that is simple, but effectual, it destroys all unhealthy odors and disease germs that may be stored in the material and converts the residue into an oil and a fertilizing material, thus utilizing what was formerly wasted.

I take pleasure in informing you that the system that I have just briefly outlined, that is to day taking care of the tons of garbage and dead animals in our city, in the finest plant of the kind in the United States, is the "*Merz*," which in my opinion is a wonderful advance in that branch of sanitary science to which it belongs.

I have the honor to remain,

Yours very respectfully,

(Sig.) HENRY F. HOYT, M. D.,
Commissioner of Health.

(Copy.)

CHICAGO, Ill., Jan. 24, 1890.

To the President of the Ladies' Health Protective Association, New York City:

I have been the Commissioner of Health of this city for the thirteen years ending last August, and have interested myself much in the matter of garbage disposal; I am familiar with the practical operation of every method or system in use to-day, in this Country or Europe, and I unhesitatingly declare my opinion that from every standpoint of economy, freedom from offense and practical every day work, the Merz System is superior to all others, indeed there is nothing to compete with it for the disposition of pure garbage.

(Sig.) OSCAR C. DE WOLF, M. D.

ADDENDUM

REPORTS AND OPINIONS

RENDERED SINCE

OCTOBER 1st, 1890

CITY OF ST. PAUL,
OFFICE OF THE DEPARTMENT OF HEALTH,
HENRY F. HOYT, M. D., COMMISSIONER,

ST. PAUL, Minn., Oct. 13, 1890.

The Merz Universal Extractor & Construction Co., New York City:

Gentlemen.—Your esteemed favor, requesting my opinion of the Merz System of disposing of garbage, dead animals, &c., is duly received, and I take pleasure in replying as follows: In the fall of 1889 the Merz System of disposing of garbage and dead animals was formally adopted by our City Government, and a contract entered into with the Azotine Manufacturing Company of St. Paul, for a period of five years, said company agreeing for a certain compensation to dispose of all garbage and dead animals by the Merz Process, that might be produced by said city during said time. They erected a plant in our city according to the Merz Method and commenced work January 1st, 1890, since which time it has been in constant operation day and night, taking care of about twenty-five tons every twenty-four hours. It takes that part of our waste material that formerly was allowed to decompose in our back yards and alleys, poisoning the atmosphere, or being dumped in our rivers and lakes, polluting the water supply, distributing disease and death in every direction. And instead of the dire results that followed the old method, we now have these dangerous substances converted, by a scientific, sanitary, odorless process, into products that are useful and in no way detrimental to health.

The material is first dried by superheated steam. The gases that are evolved are passed through a conductor and part condensed. Those that are not susceptible to condensation are then carried into a retort, built in the furnace, and there consumed.

The solid material remaining after the drying is completed, is then subjected to the action of chemicals, that extract from it all the grease that it may contain. The residue is a dark dry mass of about the same consistency of dry earth and is used for fertilizing purposes.

Garbage is composed of about 60 per cent. water and 40 per cent. solid. About 10 per cent. of the solid matter is grease. The balance of the solids are valuable as fertilizers, according to the amount of ammonia they contain.

In conclusion, I would state, that in my opinion the Merz Method is a success. It is thoroughly scientific, absolutely free from disagreeable or unhealthy odors, and I regard it to-day as *one* of the greatest, if not *the* greatest, sanitary invention of the age. It has satisfactorily solved the most difficult sanitary problem that our city has ever encountered.

Wishing you continued success, gentlemen, in your great undertaking, I have the honor to remain,

Yours very respectfully,

(Sig.) HENRY F. HOYT, M. D.,
Commissioner of Health.

INSTITUTIONS NOW IN SUCCESSFUL OPERATION

UNDER

THE MERZ PROCESS.

DETROIT: DETROIT SANITARY WORKS,
Office, No. 957 Woodbridge St., Detroit, Mich.
HON. M. H. CHAMBERLAIN, *President*,
W. C. GLINES, *Secretary*.

MILWAUKEE: FORRISTAL CREMATORY AND GARBAGE CO.,
Office, No. 89 Oneida St., Milwaukee, Wis.
HON. JOSHUA STARK, *President*.
FREDERICK L. WILMANNS, *Secretary*.

ST. PAUL: AZOTINE MANUFACTURING CO.,
Office, No. 31 East Fifth St., St. Paul, Minn.
JAMES FORRISTAL, *President*.
WM. DAWSON, JR., *Secretary and Treasurer*.

DENVER: DENVER SANITARY AND FERTILIZING CO.,
Office, No. 1609 Blake St., Denver, Colorado.
J. F. BROWN, *President*.
H. M. PORTER, *Secretary and Treasurer*.

IN COURSE OF CONSTRUCTION.

PATERSON: THE PATERSON SANITARY CO.'S PLANT.
Office, No. 207 Main St., Paterson, N. J.
HON. JAMES INGLIS, JR., *President*.
T. A. WALL, *Secretary*.

ILLUSTRATION OF

THE FLANNIGAN STEEL AUTOMATIC GARBAGE CART.

RECOMMENDED AS AN AUXILIARY TO THE "MERZ PROCESS."

Supplement to "The Merz Co's" Pamphlet, December, 1890.

Report on the Merz Process,

FOR THE DISPOSAL OF GARBAGE,

By WM. M. CHAUVENET,

PROFESSOR OF CHEMISTRY, St. Louis, Mo.

Hon. C. P. Walbridge, President of the Council.

Dear Sir—According to instructions received from the Council of the City of St. Louis, I have, as one of a committee of four, visited the various cities in which the Merz system for the disposal of garbage and animal matter has been introduced and beg to make the following report:

The cities visited were St. Paul, Milwaukee, Chicago, Detroit, and Buffalo, in the order named.

The Merz or Vienna system, as it is sometimes called, is a method of disposing of animal and vegetable refuse, not by cremation or rendering, but by dessication—that is by drying at a high temperature in closed retorts; and a chemical extraction of the oils in the dried residue.

To inquire into the sanitary nature and fitness of this process as well as to thoroughly investigate its possibilities for the disposal of animal and vegetable refuse is the purpose of this report.

A minute description of the plant cannot well be given without complete drawings which are not at hand, but an explanation of the process may aid in a better understanding of the discussion following.

The thirty ton plant in St. Paul, a description of which will answer for all the others, consists of six dryers and three extractors.

The dryers consist of concentric cylinders—one within the other—hung horizontally below the receiving floor.

The inner cylinder receives the garbage through a hopper opening to the delivery floor and carries a reel made of riveted steel and revolving through the longitudinal axis of the dryer.

The outer cylinder is nothing more than a jacket into which super-heated steam is admitted at a temperature of about 300 degrees F. Each cylinder holds about three tons of garbage and the drying operation requires about six hours.

A steam tight door is then opened in the bottom of the dryer and the contents withdrawn upon a carrier which conveys to the extractors. The

watery vapors from the dryers are passed through condensers and thence into the sewer.

The extractors are square upright tanks with a false bottom in which, during six hours, the product from the dryers is subjected to a benzine bath by means of which the oily constituents are wholly removed.

The benzine is then driven off, and recondensed, the oil withdrawn to storage tanks and the, now perfectly dry, residue drawn and conveyed for storage.

Dead animals are separately treated, in separate dryers similar in every respect to those used for garbage except that they have a special connecting pipe for filling.

The larger animals are first cut up, in a room above the dryers. The skins are saved and the rest is thrown into upright boilers sealed from the air and boiled for some hours by super-heated steam under the influence of which the parts are reduced to such a size that they slip at once into the dryers upon opening the valve of the shute.

In the dryers the animal matter is subjected to exactly the same drying process as the garbage.

The engine and boiler plants need no description as they differ in no respect from those in general use.

The question as to what takes place in this drying process is perhaps difficult to answer, theoretically, and would demand the most exhaustive chemical analysis to determine. Practically the results are easy of explanation.

As long as vegetable organic matter retains its water of composition it undergoes continual change and decomposition when exposed to the air, during which its malignant gases are set free and given off The Merz system drives off all water of composition and all moisture in a closed retort, protected from the air and at a high temperature; alters and fixes the decomposable acids and delivers a product no longer subject to decomposition even upon long standing.

The first question asked in regard to the Merz process even by those who visit the plants is, "What becomes of the gases given off from the dryers during the process of drying garbage?"

After visiting three Merz plants in active operation and after a long discussion of the matter with other chemists I am of the opinion that there is little or no gas given off in the process of drying, since I do not think the temperature within high enough to decompose vegetable fibre.

In regard to this temperature there has been some question in my mind throughout. The figure 350 degrees F. given us at the various plants was not the result of direct measurement in any instance, since this is a difficult question to determine; but since lard oil will begin to smoke and decompose at a temperature of 350 degrees in air and since no such decomposition of the animal fats in the dryer takes place in any large degree, I think we are safe in concluding that the temperature of 300 F. is nearer the truth. The very dark color of the fatty oil as it comes from the extractor is doubtless due to a slight carbonization or burning, but it must be very slight.

This conclusion has nothing to do with the sanitary nature of the process except in so far as it shows that there are probably no burning greases and gases of decomposition to escape from the works and that therefore it is not a surprise that they do not come through the condenser, which I think they would do if generated.

We have had no time to make the chemical tests which would determine these questions, but as I said above it is of no practical importance under the circumstances. Our investigation must lie wholly with the sanitary nature of the process.

THE WORKS IN OPERATION.

Though unprepared for such a result on leaving St. Louis, I am able to report as follows in regard to the offensiveness of the operation and the nature of the dry product:

On approaching the works in St. Paul no odor was perceptible outside the building excepting a faint smell of crude petroleum used for running the engines and stored in tanks some distance in the rear of the works.

In the delivery room where garbage was being unloaded and where several dead horses were being treated at the time, the smell was offensive. In that part of the works devoted to the process of drying and extracting there was no offensive odor whatever other than a faint smell of benzine.

The establishment as a whole was far less offensive than a soap factory and had none of the disgusting features of a rendering works. After the garbage and animal matter is once in the dryers, (and it goes there at once), there is no possibility of offense whatever even to the most squeamish nostril, and were it not for the pile of garbage and the animals on the delivery floor above, the works would be as free from offense as a linseed oil factory.

That they are not so, is entirely due to the crude way in which the garbage is delivered from carts out of which it is shoveled upon a floor instead of into hoppers direct, an improvement which we understand is already in operation at the plant recently constructed at Paterson, N. J.

The dried residue before the extraction of the oil, has a faint oily smell, after the extraction, as it lies in the warehouse it is as inoffensive as garden loam which it much resembles, and can be handled with impunity since it is odorless.

In the St. Paul Warehouse was a pile of this product which had been exposed to the air for some five months which showed no evidence of decomposition and which was as wholly inoffensive as when made.

THE MILWAUKEE PLANT.

The Milwaukee plant has a capacity of forty tons and is located in the heart of the city. We found this plant treating from 35 to 50 tons a day. Outside of the factory there was no offensive smell to indicate what was going on within. The garbage was being delivered in quantity and in the delivery room the smells were very offensive. The machinery was running in an orderly manner and that part of the factory given up to the process proper was inoffensive and smelled only of benzine.

There are 39 wagons delivering garbage in Milwaukee and the shoveling system in use strikes one as slovenly and unclean. The product which was stored in an open shed was totally inoffensive after six months' storage.

THE CHICAGO PLANT.

The forty ton plant in Chicago was not in operation. It is unfortunately located in the lumber districts and in an old building. The elevators in this plant for lifting the garbage to the dryers, are a mistake and should not be used.

THE DETROIT PLANT.

In the Detroit plant the delivery room was open to the same objections as those of the works above described and the garbage shoveled from box wagons upon a wooden floor raised above the street with its wide doors open to the air was the cause of much complaint. The condensing engine in this plant was an experiment and a failure, giving rise to a sour smell due to escaping gases of an acetic nature, a fault not existing at other plants.

The Buffalo plant was not in operation and was not visited, though complete figures as to the result of an eighteen months' run in which the Merz Company lost $16,000 were submitted and copied from their books. They are at the disposal of the Council but cannot be entered into here.

THE QUESTION OF NUISANCE.

I cannot too severely criticise the methods of delivery in use in all the cities visited by your committee.

It is my opinion that the odors existing within the works of the various plants visited were wholly from the freshly delivered garbage lying upon the floor and had nothing to do with the process of drying and extracting of the Merz process which is inoffensive from its nature

The plants in Chicago, St. Paul, Milwaukee and Detroit are badly located. It is not surprising that there should be complaints, which there certainly have been, in view of the present methods of DELIVERING the garbage.

These complaints have in all instances come from those living close to the works, and were due not so much to the process of conversion as to the *unclean method of delivery* and the congregation of so many garbage carts in one locality.

As to the *process* in the works themselves *we did not hear one complaint* throughout our trip.

THE REPORT OF HEALTH OFFICERS.

To report in detail, the whole of the information given us by the health officers of the various cities, would be to write a book on sanitary matters in general. I shall attempt, while condensing the whole, to give the significant facts and especially those which bear on this investigation.

THE

FLANIGAN PATENT

AUTOMATIC STEEL ODERLESS SANITARY

DUMP CART.

No. 1.

of which I beg to present in the following pages three different views, showing the position of the body when loaded, when about to be loaded, and after the contents have been dumped, is the result of years of study and experiments. I am confident, and trial and examination will outbear me in the assertion, that no cart ever put upon the market has at once combined as many advantages as my patent cart.

No. 2.

The body of my cart is made of sheet steel plates, joined and riveted together in a manner that will effectually prevent any leakage of liquid substances, such as are contained in garbage, slush and other refuse matter, and is provided with a cover, hinged to the foretop portion of the body, and so arranged that the driver may raise the same without leaving his seat. When the cover is down the cart is closed, water and air tight. Pressing the foot on the lever will cause the body of the cart to turn and dump its contents, while by means of a lever, chain and sprocket wheels located on the opposite side of the cart the body is again thrown into its orignal position, or may, if desired, be placed in a position as indicated in Cut No. 2.

No 3.

In constucting this cart I have been particulary careful in considering and overcoming all objections that are made to the old style dump-carts, and I believe have suceeeded in putting before the public, and especially the Sanitary Officials of larger cities, a cart that will meet all requirements, and forever rid the people of the dust, smell and generat nuisance that exists wherever garbage, ashes, street sweepings, etc., are conveyed through our thoroughfares in old style carts, distributing part of its contents on our streets. This cart unloads without driver stopping his horse or leaving his seat, and no part touches the ground while unloading, as is seen in Cut No. 3.

They are being used on Fifth Avenue, New York with much satisfaction to the city officials and the public and recommended by H. S. Beattie, Commissioner of Street Cleaning.

To be used in the collecting of garbage by the St. Louis Sanitary Co., in connection with the Merz Extracting Plant.

"The street department of Boston is making an effort to abate one of the worst nuisances which is daily inflicted upon the public in this city, by doing away with the wooden offal carts and their sickening ordor."—*Boston Globe.*

"The Superintendent of Streets was so much pleased with the steel cart which was here on trial, that he has purchased some for the city."—*Boston Transcript.*

Awarded First Prize and Diploma at Wisconsin State Fair Sept. 19, 1891.

Adopted by the City of Milwaukee and recommended by U. O. B. Wright, M. D., Commissioner of Health.

I use the best wheels and material that can be obtained; my cart is evenly balanced, light running and painted and finished in a manner that will make the adoption of the same a credit to any city.

I am prepared to furnish my patent cart in lots at reasonable prices, or will sell City, County or State rights to those who may prefer to manufacture the cart for their own account.

The capacity of these carts is from 1½ to 2 cubic yards.

Respectfully,

T. R. FLANIGAN,

788 Broadway, New York, (Room 3.)

Inventor and owner of United States Patent, and England, France and Germany. Patented Feb. 10, 1891.

Throughout our journey we found no health officer or public official of any kind who was opposed to the Merz system. The following gentlemen were interviewed, and all were in favor of the introduction of the Merz system:

Dr. Hoyt, Health Commisioner of St. Paul.

O. O. Cullen, President of the Council.

The Mayor of St. Paul.

Dr. U. O. B. Wingate, Health Commissioner of Milwaukee.

The Mayor of Milwaukee.

Dr. Oscar DeWolf, for fourteen years Health Commissioner of Chicago.

Mayor Roche.

Dr. Duffield, Health Commissioner of Detroit.

The Mayor of Detroit.

Dr. Green, Health Commissioner of Buffalo.

Dr. Clark, former Health Commissioner of Buffalo.

Dr. F. P. Vandenbergh, City Chemist.

The interviews were conducted in open meeting and resolved themselves into a sort of cross-examination.

In reviewing, then, the many interviews and debates in regard to the Merz system, continuing through many days, I find the representatives of the several communities in which the Merz plants have been in operation *universally in favor* of its introduction. My own investigation, both sanitary and chemical, leads me to the following conclusions:

1st. That the *Merz system* from a chemical standpoint is an ingenious and *perfectly rational process.*

2d. That it is a *perfectly inoffensive* and sanitary process for the conversion of offensive animal and vegetable refuse into an odorless and inoffensive product.

3d. That the *complaints* against the system are *wholly due* to the method of handling and *delivering* the garbage for which methods the Merz system is in no way responsible.

4th. That with proper methods of collection, proper steel dump wagons, and properly arranged hoppers for the reception of the refuse the *Merz system will be perfectly free from objectionable features*, and a decided advance from a sanitary point of view over the unclean and shameful methods of disposal now in vogue.

We are told that at Patteson, N. J., the improvements in delivery and the arrangement of hoppers is complete,

Improved dryers are also there introduced which together with the hoppers were minutely described to me by the engineer of the Plant, Mr. Fred. G. Wiselogel.

So constructed with the improvements suggested above *the Merz plant will be free from all offense as a factory.*

The most objectionable feature of the present system of delivery in use in the various places where the Merz plants are established is the stupid closed wooden cart without even a movable tail board. From this cart the garbage has to

be lifted over the side with a shovel at times as in the Milwaukee system. There can be no escape from foul odors as long as so slovenly a plan is allowed to remain.

Automatic dump carts are already in existence and are an essential part of any delivery system. The garbage boxes too must be designed for the purpose and maintained by ordinance before the system will be orderly or cleanly.

Before concluding this part of my report, I wish to clearly state that I consider the Merz process as successful in the treatment of dead animals as of garbage and a godsend to any community now suffering the outrage of the rendering process by the old and only too well recognized plan.

It may be well, since we looked thoroughly into the matter to include in this report such facts as we gathered in regard to Crematories.

DISPOSAL OF GARBAGE BY CREMATION.

By cremation is meant the *destruction* of garbage and refuse matter generally by fire, in furnaces built for the purpose.

Such a system has been in use in Minneapolis, in Milwaukee, in Chicago, Detroit, Buffalo and in many other places.

In the five cities named the *furnaces have been condemned as nuisances* by the present health officers.

The furnace known as the ENGLE FURNACE was tried by Dr. Kilvington, health commissioner of Minneapolis, both there and in Milwaukee, proving A COMPLETE FAILURE in both places.

From Dr. Wingate, of Milwaukee, we learned the following in regard to the *Engle furnace* built by DR. KILVINGTON in that city, where it was tried for a period of some months:

The furnace would NOT consume the garbage and it took from three days to two weeks to consume twenty loads, in the ashes of which there was still considerable unconsumed matter.

It was *very expensive* and a *decided nuisance* and was abandoned.

Dr. DeWolf, of Chicago, long experimented with crematories, *pronounces them a failure.* THE MANN furnace placed in a quarry near Chicago *failed to consume the garbage*, even that which went through the furnace being but partly consumed.

Its *capacity* was very *limited*, its *stench abominable.*

Dr. Duffield, of Detroit, *considers crematories a failure.* One crematory there could consume imperfectly only eight tons a day, creating a nuisance at the same time.

Dr. Clark and Dr. Vandenbergh, of Buffalo, after special investigation of the crematories in Milwaukee and Chicago pronounce them expensive and inadequate for the purpose and *condemn the cremation plan* as a failure for sanitary reasons as well.

Personally I regard the attempt to cremate garbage a mistake because it is almost impossible to utterly consume it, even at the most intense heat, the furnaces have therefore but limited capacity.

It creates the foul odor and incondensable gases consequent upon burning vegetable refuse to say nothing of old leather, old rubber and old cats and dogs, which invariably find their way into the garbage pile.

It gives off to the air the very foul gasses and odors which it is intended to destroy, while it dissipates and destroys the valuable ammonia compounds which it should be its purpose to save.

For the burning of sweepings and dry refuse on a small scale I believe it would be useful, but *for the destruction of garbage and animal matter I regard the crematory a failure*, and, from a sanitary standpoint, a mistake.

Your committee also investigated the question of the disposal of garbage and sewerage by other methods, giving special attention to the practice of *garbage farming* which *unclean method* of disposal has been tried in various cities.

The garbage farm I consider the very worst method ever resorted to for the consumption of the city refuse. It is a failure from the start, since greasy garbage is of little or no use as a fertilizer, and it converts the suburbs of a large city into an unsavory and unclean district since there are certain portions of the garbage which never seem to decay or to wholly lose their odor. Sewerage farms are not much better and it is time that the communities in this country wake up to the fact that the larger communities in Europe are in a distressingly unclean condition from the abuses of the garbage and the sewerage farms.

The farming system was condemned by every health officer interviewep throughout our trip.

We therefore return to the Merz system.

The question of cost of the Merz system it is not my purpose or my business to discuss. For the sake of reference I append such figures as were gathered from the best authorities in the various places visited.

St. Paul, with a population of 125,000, spends $26,000 for collection and disposal of garbage and animal matter.

Milwaukee, $24,000 for collection of garbage alone, and $15,000 for the disposal of same. Total $39,000. Merz system.

Chicago, $400,000 for the collection and disposal of garbage on the old plan. This figure seems extraordinary but was given us in the health office from reliable sources.

Detroit spent $40,000 for collection and disposal of garbage from July, 1888, to July, 1889. Under the old system.

Under the present Merz system 10,000 tons of garbage were collected and delivered to Merz plant at a cost of $35,000.

Buffalo spends annually $106,000 for sanitary matters.

The figures given us at Buffalo show that the cost of running the Merz plant for eighteen months was $4.90 per ton, of raw garbage. A loss of $16,718.22 is reported for the time.

Before concluding I wish to point out the necessity of proper collection of garbage and refuse under any system you may adopt.

1st. Complete separation of ashes and tin cans from all vegetable garbage must be insisted on and commanded by ordinance. Separate bins must be provided for such matter, in every case and on no account should any dead animal be put into the ash piles. Householders should be made intelligently to understand the reason for this and the importance of it.

2nd. The garbage carts must be of iron or steel and be closely covered and dumped without the use of the shovel.

In Milwaukee the ordinance commands that the collection be made before 12 noon in Summer and before 2 o'clock P. M. in Winter. The collection is made by any one who will furnish the proper wagon at the rate of two dollars per day for each man so employed.

I regard the Milwaukee system the most successful of those we saw. There is, however, room for vast improvement in the methods of collection, a subject to which Dr. Wingate is now giving his attention.

I trust that the important facts as to contracts and ordinances gathered by the committee will be furnished you by them in order to supplement the matter which I have brought together here and to which the short time at my disposal and my inexperience outside of my profession naturally confine me.

In conclusion allow me to state that I fully appreciate the honor of being chosen for so important a mission.

Very respectfully,

(Sig.) WM. M. CHAUVENET.

To Hon. C. P. WALBRIDGE,

President of the Council.

St. Louis, Dec. 10, 1890.

LOUIS FLEISCHMANN, President.. WILLIAM GREVEL, Secy. & Treas.

Nov. 11/91

The Merz Universal Extractor & Construction Co.

788 Broadway, Room 31
New York, Nov. 10th, 189 1

To the Surgeon General,

U. S. Army,

Washington, D. C.

Sir,-

We have the honor to acknowledge the receipt of your highly esteemed favor of 9th inst. and in prompt compliance with your request thereby conveyed, have taken the liberty of forwarding to you this day, all printed matter pertaining to our process for the disposition of Garbage.

Respectfully recommending our pamphlet and auxiliaries to your kind perusal, more especially with a view towards its adoption and employment by the District of Columbia in the City of Washington, we beg to express our sincere appreciation for the kind consideration shown us in the premises, and remain,

Sir,-

Most respectfully,

Your obedient servants,

The Merz Universal Extractor & Construction Co.

Secy. & Treas.

letting 3270, two bids.
All of which were referred to the Committee on Public Buildings with instructions to report next Tuesday at 10 a. m.
Sundry documents were referred.
Adjourned.

EMORY S. FOSTER,
Secretary.

SPECIAL NOTICES.

PROPOSALS FOR REMOVING DEAD ANIMALS.

In accordance with the provisions of article 2, chapter 14, of the Revised Ordinances of 1887, sealed proposals for the removal of the carcasses and remains of all dead animals from the streets, alleys and public places of the City of St. Louis, or on private premises therein, as provided for in said ordinance, will be received by the Board of Health, at the office of said Board, till December 19, 1890, at 4 p. m.

The contract for the removal of carcasses and remains, or parts thereof, of all dead animals, will require that the contractor shall move the same outside of the city limits, and one mile beyond the jurisdiction of the Board of Health, and that he shall observe every care and use the utmost precaution that the same may be conveyed away in the most inoffensive manner possible, and cause them to be covered with tarpaulins or removed in tightly covered wagons, as the Board of Health may direct.

The period of time to be covered by said proposals to be for the term ending November 30, 1893.

Two classes of bids will be received:

First—Bids offering to pay the City of St. Louis a specific sum of money, in monthly installments, for the privilege guaranteed by article 2, chapter 14, Revised Ordinances of 1887, for the period of time as above stated.

Second—Bids offering to do the work provided to be done by said article 2, chapter 14, Revised Ordinances of 1887, for the period of time above stated, for the lowest amount of money to be paid by the city, said payments to be paid in monthly installments. All bids must be in duplicate and free from alterations or erasures, and to each there must be attached a copy of this advertisement.

Each bid must be accompanied by a certificate showing that $200 have been deposited with the City Treasurer as an earnest that the bidder, if awarded the contract, will enter into satisfactory bond with the city for the faithful performance of his contract.

In the event that the Merz or any other system of disposing of the dead animals in the City of St. Louis is adopted and put into effect during the existence of the contract made under this advertisement, the contractor hereunder shall, on order of the Board of Health, deliver the dead animals at the stations of said system or at such points as may be designated by said Board; and the contract is let subject to the provisions of ordinance 15,718.

The Board reserves the right to reject any and all bids.

Bids will be opened at the office of the Board of Health on December 19, 1890, at 4:30 p. m.

G. F. DUDLEY,
Health Commissioner and Presiding Officer Board of Health.

Attest:
EDWARD A. FINNEY, M. D.,
Secretary Health Commissioner and Board of Health.
3-19

PUBLIC NOTICE.

OFFICE OF THE PRESIDENT OF THE BOARD OF PUBLIC IMPROVEMENTS,
ST. LOUIS, December 11, 1890.

Public notice is hereby given that the Board of Public Improvements will hold a special meeting on the hour of 10 a. m. of the

30TH DAY OF DECEMBER, 1890,

in the office in the City Hall, for the purpose of considering the matter of opening, widening and grading width of carriage way of streets and alleys as hereinafter mentioned, viz.:

No. 2746. Petition No. 4039. For opening Arthur avenue from Old Manchester road to Wilmot avenue.

No. 2747. Petition No. 4040. For opening Hamilton avenue from Kennerly avenue to National Bridge road.

No. 2748. Petitions Nos. 4050 and 4272. For opening alley in city block No. 3976, from Tower Grove avenue to Mount Vernon avenue and between Norfolk avenue and Swan avenue.

No. 2749. Petition No. 4070. For widening Union avenue between Manchester road and Chamberlain avenue.

No. 2750. Petition No. 4105. For opening Herbert avenue from Knight street to Page avenue.

No. 2751. Petition No. 4111. For opening Bartmer street from Evans avenue to Easton avenue.

No. 2752. Petition No. 4132. For opening Rutger street from Grand avenue to Cabanne street.

No. 2753. Petition No. 4133. For opening Bacon avenue from Grand avenue to proposed Vanderventer avenue.

No. 2754. Petition No. 4134. For opening Cottage street from Grand avenue to Cabanne street.

No. 2755. Petition No. 4135. For opening alley in city block No. 2981, from Haven street to Cole street, and between Minnesota avenue and Michigan avenue.

No. 2756. Petition No. 4152. For changing width of carriageway to 30 feet on McPherson avenue between Boyle avenue and Taylor avenue.

No. 2757. Petition No. 4174. For opening alley in city block No. 3775, from Deer street to Texas avenue, and between Evans avenue and Compton avenue.

No. 2758. Petition No. 4186. For opening Chamberlain street from Broadway to Virginia avenue.

No. 2759. Petition No. 4211. For opening east and west alley in city block No. 2153, between Nebraska avenue and Todd avenue, and between Vincent avenue and Park avenue.

No. 2760. Petition No. 4212. For opening Flad avenue from the west line of the Papin tract to Union avenue.

No. 2761. Petition No. 4246. For opening Virginia avenue from Rappahannock street to Shenandoah street.

No. 2762. Petition No. 4247. For opening Iowa avenue between Geyer avenue and Lafayette avenue.

No. 2763. Petition No. 4248. For opening alley in city block No. 3974, from Mount Vernon avenue to Taylor avenue and between Swan avenue and Manchester road.

No. 2764. Petition No. 4251. For opening Bell avenue from the east line of Henry B. Bell's subdivision eastwardly to Union avenue.

No. 2765. Petition No. 4256. For opening Indiana avenue from Rappahannock street to Shenandoah street.

No. 2766. Petition No. 4264. For opening alley in city block No. 2205, from Theresa avenue to Grand avenue, and running north of and parallel with Clark avenue.

No. 2767. Board's Motion. For opening Morgan avenue 80 feet wide, from Union avenue northwardly, and 195 and ten twelfths feet north of and parallel with the north line of Forest Park boulevard, to its intersection with McPherson avenue, as now laid out near Walton avenue.

No. 2768. Board's Motion. For opening Westminster Place 70 feet wide, from Union avenue northwardly, and 650 and ten twelfths feet north of (2), three (3), four (4), five (5), six (6), seven (7), eight (8), nine (9) and ten (10), in City block 4,781 south; said lots nine (9), ten (10) and eleven (11) having an aggregate frontage of 153 feet 8 inches on the South line of Duncan avenue, said lots twelve (12), thirteen (13), fourteen (14), seventeen (17), eighteen (18), nineteen (19) and twenty (20) have an aggregate frontage of 424½ feet on the north side of Audubon Place. Lots one (1), two (2), three (3), four (4), five (5), six (6), seven (7), eight (8), nine (9) and ten (10) have a frontage of 518 8-12 feet on the south side of Audubon Place. For a full and complete description of the above lots see Shield's Duncan avenue subdivision in Plat Book No. 12 at page 99 Recorder of Deeds for City of St. Louis. In trust to secure the payment of certain promissory notes in said deed of trust fully described, and whereas one of said notes is past due and remains unpaid, and whereas the taxes and insurance on said property are past due and remain unpaid, notwithstanding the terms and conditions of said deed of trust required their payment.

Now, therefore, at the request of the legal holder of said notes and in pursuance of the terms and conditions of said deed of trust, I, the undersigned trustee, will on

MONDAY, THE 29TH DAY OF DECEMBER, 1890.

Between the hours of 10 o'clock a. m. and 4 o'clock p. m. of that day proceed to sell the above described real estate at the eastern front door of the Court House in the city of St. Louis, Mo., at public vendue to the highest bidder for cash to satisfy said deed of trust and the expenses of executing the same.

HENRY L. SUTTON,
Trustee.

Dec. 4, 1890.

TRUSTEE'S SALE OF REAL ESTATE.

BY VIRTUE OF THE PROVISIONS OF A DEED of trust dated the 23d day of February, 1888, and of record in the Recorder's office of the City of St. Louis, in deed book No. 857, at page 205, made by Kittie Clyde Payne, William H. Payne, her husband, and John A. Agee, trustee for the said Kittie Clyde Payne, to the undersigned trustee, public notice is hereby given that the undersigned will, for the purposes of said trust, on

THURSDAY, THE 8TH DAY OF JANUARY, 1891,

between the hours of 10 o'clock a. m. and 3 o'clock p. m. of that day, at the East front door of the Court House in said City of St. Louis, at public auction, to the highest bidder for cash, sell the real estate conveyed to him by said deed, viz.:

The following described real estate and improvements thereon, situated in the City of St. Louis and State of Missouri, to-wit:

Lot number twenty-one (21) in block number seventeen (17) of the third (3rd) sub-division of the Wash estate in city block thirty-six hundred and eighty-six (3686) of St. Louis, Missouri, a plat of which said sub-division is on file and duly recorded in the office of the Recorder of Deeds for the City of St. Louis, Missouri, said lot having a front of fifty seven feet (57 ft.), eight and three-fourths (8¾) inches on St. Ferdinand street by a depth of 130 feet to an alley.

R. M. NICHOLS,
TRUSTEE.

TRUSTEE'S SALE OF REAL ESTATE.

BY VIRTUE OF THE PROVISIONS OF A DEED of trust dated the 29th day of June, 1876, and of record in the office of the Recorder of Deeds for the City of St. Louis, State of Missouri, in Deed book No. 548, at page 429, made by Samuel S. Hawkins to the undersigned trustee, public notice is hereby given that the undersigned will for the purposes of said trust, on

THURSDAY, THE 8TH DAY OF JANUARY, 1891,

between the hours of 10 o'clock a. m. and 3 o'clock p. m., of that day at the East front door of the Court House in said City of St. Louis, Missouri, at public auction, to the highest bidder for cash, sell the real estate conveyed to him by said deed, viz.:

The following described real estate in "Fairmount," a suburban villa of St. Louis, in St. Louis County (now city) to-wit:

The eastern one hundred (100) feet off of lot number two (2) in block number seventeen (17) of said "Fairmount Addition;" said 100 feet fronting on the north line of Wilson avenue by a depth northwardly of one hundred and sixty-five (165) feet, in city block No. 4075.

JEPTHA H. SIMPSON,
TRUSTEE.

ARRIVALS.

Josie ..... Alton

DEPARTURES.

Alice Blair ..... Memphis
City of Sheffield ..... Florence
Josie ..... Alton

The gage registers 3.1 feet and the river is still falling.

Height of middle span of the Eads bridge, 83 ft., 3 in., side spans 5¾ feet less.

Height of middle span of the Merchants' bridge, 81 feet; side spans, 2¾ feet less.

This was a dull day on the levee; only one arrival, the Alton Packet Josie.

Only two boats at the wharf to-day; and they are laid up.

The work of repairing the Fred Herold is progressing rapidly. The will be able to take her turn in trade in about 10 days.

The next valley boat will be the Jay Gould. She leaves next Saturday with a string of barges loaded for the Southern market.

The ferry boats are doing good business at present.

The City of Sheffield left last night with all the freight she could handle on the stage of water—one item being 2,000 sacks of grain, which she will discharge at East Cairo, for the Mobile & Ohio railroad.

The Wiggins Ferry Company finds trouble in getting to the Spruce street landing on account of low water. The company has fitted up another wharf boat and landing at the foot of Locust street.

The outgoing boats are having much trouble in getting out to Cairo, as the water is too low to allow even the light boats to load to their full capacity.

Nellie Speer went South after a couple of barges of lumber consigned here.

The steamer My Choice, of the Barge Line, has laid up at Cairo, and her crew will come up by rail.

The Henry Lowery took ten cars of grain at Cairo, and left for New Orleans with four barges loaded with bulk grain and merchandise.

The "Floating Bethel" is still at the foot of Carr street, and services are held nightly and are immensely crowded and the evangelists are making a good impression. Many sight-seers from the city come down through curiosity. The exercises are somewhat emotional, such as are likely to attract and influence the people in that neighborhood.

If the river men will send up items to THE CALL they will be received with thanks and will be cheerfully published. Our "river column" is not perfect, but will be as nearly so as possible when we get in running order.

The Ohio, of the Cincinnati and Memphis Packet Co. sank in eight feet, near Cottonwood Point yesterday morning. She had a light cargo. The wrecking boat, Hill, with divers, has been sent down to raise her, and the prospects are that she will be afloat in two or three days.

The Buckeye State arrived at Cairo and put off 2,000 kegs of nails and will lay over till the superintendent, R. W. Wise, of the Line arrives from Cincinnati. She will then take the wrecking boat Hill and divers to the sunken Ohio.

The Thomas Sherlock arrived at Cairo loaded flat and refusing all offers.

All the boats out of Cincinnati can get more freight than they can handle.

There is pretty fair water (8 feet) at Caseyville, and stationary.

Pilots Harry Eldridge and Enoch King, Engineer Geo. Deeters, and other members of the crew of the Steamer City of Baton Rouge, which was destroyed near Port Hudson last Friday, arrived here yesterday. Capt. Horace Bixby went on to New Orleans, then returned to the scene of the wreck. He will come to St. Louis in a few days.

Many of the steamboatmen spoke of the "superstitious three theory" in reference to accidents. This has again been fulfilled within the past four days by the sinking of the City of Baton Rouge, the Nellie Hudson and the Ohio.

The steamer B. U. Barnsdale has been libeled in the United States Court at Columbus, O., for transporting benzine between Parkersburg and Marietta contrary to law. The penalty for the offense is $2,500 fine and eighteen months' imprisonment.

Capt. T. P. Leathers has received his insurance on the lost T. P. Leathers, which burned some two weeks ago. The companies in which the Natchez was insured are still trying to avoid settling. The boat sank on January 1, 1889.

List of snags removed by the United States snag boat McComb in the Mississippi River during the week ending Saturday, December 13, under the supervision of Maj. A. E. Miller; 1 at Kemp's, 2 at Bieller's, 1 at Buckridge, 1 below Omega, 4 at Island 102, 1 at Brunswick Point, 1 at Hall's, 1 at Shipland, 3 at Homochitto, 2 at Wilson's Point, 2 at Wilderness, 2 below Sterling, 1 at Seven Oaks, 2 at Walnut Point, 1 at Sunnyside, 1 at Point Chicot, 1 at Point Comfort. 4 in Georgetown Bend, total 31; cut 933 in Louisiana Bend.

The Best Christmas Gift for $1, a ticket in the Public Library—76,000 volumes.