

cessfully to oppose the force of its antagonist. Accordingly, its tendon was detached from the sclerotic and secured by the forceps. The effect not being sufficient, the muscle was liberated from its capsular attachment by incisions parallel to its course. It was thus rendered possible, by means of the inferior advancement suture, to secure a parallelism in the horizontal plain. The superior rectus was then shortened and allowed to retract back of the equatorial meridian of the eye, that it might not overbalance the strength of the dislocated inferior rectus. The immediate result was good. Some vertical motion was restored. The lids closed naturally, covering the ball.

Three days later the patient reports slight pain since the operation. Conjunctiva much congested. Vertical motion 30° . Amount of exophthalmos unchanged, but less conspicuous, owing to the closure of the lids over the sclera.

April 20, 1888, two months later. Returned for the correction of the external strabismus, which still remains 25° . At this time there was 5° of superior deviation. Vertical motion measured 30° .

The external deviation was corrected by a tenotomy of the externus with an advancement of the internus, one suture being inserted into the muscle, and the other into the episcleral tissue forming a pulley over which the advancement can be made with precision to any required degree, securing with a bow-knot, to permit of subsequent modification, as explained in a communication to the *Ophthalmic Review*, Sept., 1887.

The following cuts, which scarcely require explanatory text, may aid in the elucidation of the method of advancement attempted in each of the above cases.

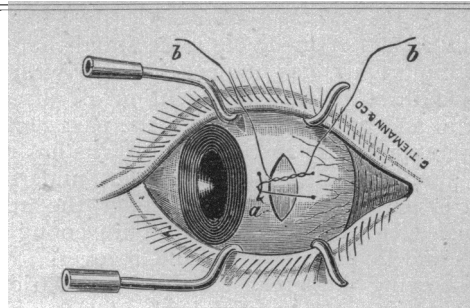


Figure 3.

By the aid of the needle, figure 1, it was found possible to insert the advancement suture, though the muscle itself could not be brought into view.

CONCLUSIONS.

The conclusions suggested by the above cases are: 1st. In the case of complete paralysis of either rectus, the exsection of the opposing muscle will enable the eye to be retained in the straight position, without motion in that meridian.

2d. In case of retraction of either rectus muscle into the orbit, under conditions rendering its advancement impossible, an equalization of the deviating power is to be obtained through section of its antagonist, posterior to its capsular attachment, following which, excursions in that meridian will be restored to an extent varying between twenty and fifty degrees.

3d. In the above cases of paralysis, or retraction of either rectus, the operation of section or exsection of its antagonist has not been observed to develop or increase any preëxisting exophthalmos.

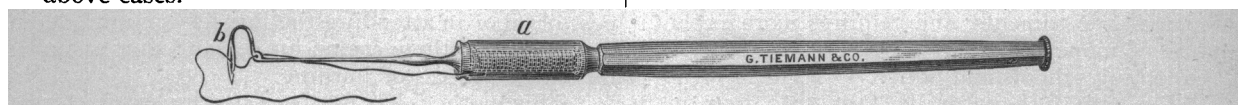


Figure 1.

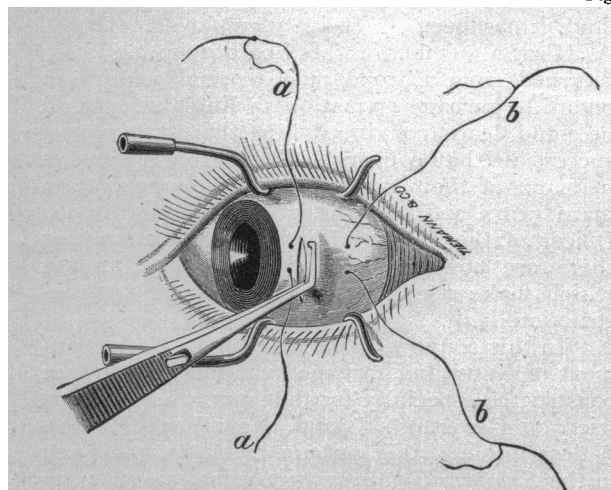


Figure 2.

ON THE CREMATION OF GARBAGE.

Read in the Section of State Medicine, at the Thirty-ninth Annual Meeting of the American Medical Association, Cincinnati, May, 1888.

BY J. BERRIEN LINDSLEY, M.D.,
OF NASHVILLE, TENN.

Very few persons outside of the limited circle whose official duties place them in constant contact with the offensive topic have any conception of the enormous amount and varied character of the filth generated by the daily life of a great city.

Hence they do not understand why it is that practical sanitarians are everlastingly harping upon cleanliness as the *sine qua non* of civic health; and earnestly calling for stringent legislation and large appropriations to enforce and carry out sanitary ordinances which shall maintain a pure soil within the city limits.

Practitioners of medicine understand that pure air, or impure air, has immensely to do with success or failure in the treatment of all diseases. Hospital and prison history for the past century, and infant mortality in cities and towns has made this a familiar fact. Few, however, understand that it is perfectly possible to render the atmosphere of even the largest cities pure enough for infants and invalids to grow and recover.

As showing the great quantity and variety of polluting material occurring without pause within the limits of a city, two or three examples may be given.

Baltimore, August, 1887, estimated by police census, had a population of 437,155. The amount of night-soil delivered at the dumps for the year ending December 31, 1887, was 51,107 loads, or 10,221,400 gallons. Probably more than half the inhabitants use water-closets, which carry off an equal amount. The dead animals, etc., removed during the same year, were:

| | |
|---|--------|
| Total number of dead animals | 25,249 |
| “ “ “ fowls | 9,074 |
| “ “ “ fish | 23,574 |
| “ “ cart-loads of dead fish, vegetable and other offal removed from various docks | 1,067 |
| “ number pounds of decayed meat condemned | 1,495 |
| “ number dozens of eggs condemned | 607 |

Richmond, population 100,000. The report of contractor for removal of garbage, or kitchen refuse, year 1887, shows total number of loads carried off, 2,680 = 72,200 bushels.

Memphis, population 62,335. Number of loads of garbage removed in 1887 was 29,120.

These examples are selected at random. To keep the city clean is the principal work of municipal governments, and requires more expenditure of money than all other objects combined, excepting schools and police.

The city filth naturally falls into four main subdivisions—street sweepings, night-soil, dead animals, and garbage. The latter alone concerns us at present. The definition of garbage is refuse animal and vegetable matter from the kitchen. Every household is a workshop for garbage. In the country and small villages many a family is poisoned by the careless accumulation of the same near the well or sleeping apartment. In small towns it is mainly got rid of by feeding to swine and cows. In larger communities by carting off and polluting harbors or rivers.

Very recently, a great improvement has been introduced, to-wit, the destruction of garbage by fire. The object of this paper is briefly, but emphatically, to call attention to a great sanitary device which is not getting into public use near so rapidly as it ought.

In the Second Report of the State Board of Health, of Maine, 1887, the Secretary, Dr. A. G. Young, says: “Of the several methods which

have hitherto been in use (for removing garbage), it may be said that none of them are free from serious objections. If the garbage is carried any considerable distance into the country its transportation is attended with considerable cost. If buried, it still often remains a nuisance by contaminating the air or polluting the water in the neighborhood. If utilized in part as food for swine or cows, there is sometimes inflicted upon the community which sends it forth a retributive penalty in the shape of an unwholesome milk and meat supply.

“In the case of a sea-board town, if it is sent seaward, the garbage may depart from the place of its origin never to return, but in large part it is strewn along other coasts.

“The great desideratum has seemed to be some method which would not require a costly transportation of the garbage, or necessitate the defilement of our sea-shores, but which would radically and ultimately destroy it near the place where it is produced.

“Within the last few years a new method of disposing of garbage has been written and talked about, and to a considerable extent put into operation and practically tested. It is the method of destroying, or cremating, garbage by means of furnaces specially constructed for that purpose. Where these furnaces have been put into use, there is pretty uniform consensus of testimony as to their success. When rightly built they have done their work satisfactorily, and generally at considerably less expense than has hitherto been incurred in disposing of the garbage otherwise. But little or no cost is incurred for fuel to run the furnace, as the garbage is dried more or less before it is burned and is made to consume itself. The cost of labor in attending the furnace is not great, and generally there are no unpleasant odors given off in the process of burning.

“This method has not been much used in this country, but in Europe, and particularly in England, it has been extensively employed. Dr. O. A. Horr, a member of this Board, who has lately returned from Europe, made special inquiry in regard to garbage cremation in England, and all he could learn convinced him this system is a success in that country. The garbage furnaces in many of their towns have been in operation many years, and, in conversation with the Health Officer of the City of London, he learned that there are now forty-five of the English towns which make use of this method of garbage destruction.

“In this country, as far as I know, the experiment of destroying garbage by means of a furnace constructed especially for that purpose, was first tried on Governor’s Island, New York Harbor. A description of this garbage-cremator was given in the *Sanitary Engineer*, of August 13, 1885, by Lieutenant Reilly, at that time Acting Assistant-

Quartermaster, U. S. A., at that post." This description is reproduced in the report above quoted.

In the twelfth volume of "Public Health," containing the reports and papers presented to the American Public Health Association, at the Toronto meeting, October, 1886, may be found a paper by Dr. George Baird, of Wheeling, giving an account not only of the destruction of garbage, but also of night-soil, by means of a furnace contrived by M. V. Smith, M. E., Bissell's Block, Pittsburgh, Penna. Dr. Baird is brief, and has "only tried to furnish proof of its capacity to solve a long-tried problem in the government of our cities and large towns."

The city authorities of Wheeling were stimulated to action by those of Bellaire, Ohio, on the opposite side of the river, but in close proximity. The dumping of night-soil and garbage from Wheeling into the Ohio river had become an intolerable nuisance to the inhabitants of Bellaire living just below. No alternative remained but to abate the nuisance. A similar alternative will soon be forced upon many of our riverside cities and towns. Law will decide that rivers do not belong to those who happen to dwell near the source, but equally to all below, and that the upper few have no right to deposit their filth in floating columns upon the lower many.

In the "Report on the Sanitary State of Montreal, for the year 1886, will be found an interesting narrative in this connection, giving instructive details as to cost, showing the extent of the work to be done and the complete success of the refuse crematories, and also of the night-soil crematories constructed by Mr. Wm. Mann. Dr. Louis Laberge, Health Officer of Montreal, read an elaborate paper on this topic at the meeting of the American Public Health Association, in Memphis, last November, which will be found in the thirteenth volume of "Public Health," now in press.

It thus appears that Wheeling and Montreal are the pioneer cities in arousing public attention to the cremation of garbage and night-soil. Other cities are taking hold of the experiment with much enthusiasm. The *Sanitary News*, of Nov. 19, 1887, states that at Des Moines, Iowa, a small Engle furnace is in experimental use, and is working very satisfactorily. At Pittsburgh a Rider furnace has just commenced its service. In Chicago a Mann furnace was being constructed. In the same valuable journal, March 17, 1888, may be found a full description of the Chicago garbage crematory, from which a duplicate of the plant could be built if desired. On April 14, it reports that the said crematory is doing good service in disposing of about fifty tons of material a day. The *Sanitary News*, of March 10, 1888, reports the success of the disposal of garbage by cremation at Milwaukee.

All who are concerned in this important subject will look forward with great interest to a paper on cremation to be read at the Milwaukee meeting of the American Public Health Association, November next, by Oscar C. DeWolf, M.D., the eminent Health Commissioner of Chicago.

We have seen how very recent is the resort to cremation in America for getting rid of garbage and other refuse; and it may with truth be claimed that Mr. J. M. Keating, the distinguished editor of Memphis, familiar with epidemics, first set this ball in motion. At the Indianapolis meeting of the American Public Health Association, October, 1882, he presented a paper on "The Cremation of Excreta and Household Refuse." He closes the paper thus: "There is no real safety save by cremation. Yankee ingenuity, once directed in this channel, will doubtless be equal to the emergency, and provide just the kind of cheap furnace or stove necessary for the purpose. By this means, and this alone, can the ultimate of sanitation be realized."

Already, in 1879, Mr. Keating had presented his views on this subject through the *New York Herald*, and with the endorsement of that influential paper. In the American Public Health Association, however, he had a deeply interested auditory of experts, and his views attracted much attention. He was induced by many of its active members to prepare an elaborate paper for its meeting at St. Louis, October, 1884, which was published under the title, "The Ultimate of Sanitation by Fire." This is probably the most complete and thorough monograph on the subject in the English language. It was widely circulated in the volumes of the American Public Health Association and through other channels.

Individually I subscribe to the principles and practical conclusions maintained and explained by Mr. Keating, and feel quite confident that in a few years Yankee inventive ingenuity will provide in great perfection the apparatus necessary for daily and cheap use. On this occasion I have confined myself to the cremation of garbage, because I am convinced that it will speedily come into use throughout America with like rapidity as has electric lighting, and will pave the way for a wider and more perfect application of sanitation by fire.

DR. JOHN MORRIS, of Baltimore, Md., thought the speaker's views would meet with general support. The interest in the topic was evidenced by the increasing number of garbage crematories. The health officer of Baltimore has recently visited Pittsburg to inspect the operation of the garbage crematory in that city, with the intention of building a similar one in Baltimore.

DR. JONES, of Cincinnati, O., referred to the epidemic fever at Bellaire, O., which was due to the faulty method of garbage destruction. With

all health officers he agreed that an improvement in this would conduce greatly to the extermination of such epidemics; and only by burning the garbage was a possible source of disease eradicated.

DR. W. L. SCHENCK, of Kansas, agreed with the ideas expressed in the paper, and believed there was no other way as yet discovered to solve the problem of garbage destruction than by cremation. He was brought up on the Miami River, which was then a beautiful stream; now it was so polluted by garbage thrown into it, that the water could not be used for domestic purposes.

DR. LEE, of Pennsylvania, said, apropos of sanitation by fire, a good many who are present at this meeting attended the meeting of the American Public Health Association when the late Dr. Germer, of Erie, described the methods of sanitation by fire employed at the pest-house at Erie, Pa.—a can of kerosene and a match. There appeared to be no doubt that the future will demand sanitation by fire. Pittsburg had to meet the question, and devised a very satisfactory refuse crematory, in which he had seen wet tan bark consumed, and this was certainly satisfactory evidence of the efficiency of the crematory.

DR. MORRIS, of Baltimore: The only objection I can see to the general adoption of the plan is the expense. In Pittsburg natural gas was employed, a cheap fuel in that locality.

DR. LEE, of Pennsylvania: In the garbage crematory on Governor's Island the expense of operating is not as great as might be imagined. That crematory dries the garbage one day, and the next it is employed as fuel.

DR. J. B. HAMILTON, Surgeon-General U. S. Marine Hospital Service: In each family the means of cremating garbage exists. A garbage cart has not called at my house in several years, because all refuse is burnt in the kitchen fire. I do not believe an ordinance compelling this means of garbage disposal would be feasible, but think it might be accomplished through the authority vested in health officers. The improvements in the mechanical arts would justify the hope for the invention of a simple apparatus which could be employed in each house; something that would dry the garbage and then burn it. It seems to me that this plan of disposal is too generally neglected in household sanitation.

DR. LEE, of Pennsylvania: I know of several families who employ this plan, and I think it is more generally in use than is supposed.

DR. H. P. WALCOTT, of Massachusetts: I consider that Dr. Hamilton has more nearly hit the nail on the head than anyone. The object of the community is to do that which the individual cannot accomplish without unnecessary labor or expense on his part. It is for this reason that the combination of the efforts of many individuals constructs sewers and lays water pipes. But when it comes to garbage, each one has the means of

completely destroying it himself. When the impossibility of completely destroying the fæces of typhoid fever, etc., by the means most commonly employed, even by bichloride of mercury, is considered, sanitary and health officers should bestow more attention on the only method which promises the successful attainment of this end, viz.: fire.

DR. ORME, of California: How can the garbage of cities be disposed of on a large scale?

DR. HAMILTON, U. S. Marine Hospital Service: It is only a question of combustion.

DR. ORME: Can health officers compel it? They might be able to do so in Eastern States, but this would not be possible in California.

DR. WALCOTT: It is a matter of experience. In the Eastern States health officers subject householders to much greater inconvenience. As, for instance, the requirements to keep the garbage in special receptacles; it is only removed at certain hours, it will not be removed if mixed with ashes, etc. If all these restrictions are successfully enforced, it would appear to be quite as feasible to require each householder to burn his own garbage.

DR. ORME: This question has caused a great deal of trouble in San Diego. What other cities have successfully employed cremation, and what are their crematories?

DR. LINDSLEY: Directions for reference to health authorities were given in his paper. They would undoubtedly supply all data.

DR. LEE: Dr. Walcott has suggested the idea of the household cremation of fæces; this sounds repulsive—even impossible. But in my own household I had a patient, a young man suffering from melancholia. My family informed me he had not used the water-closet for several days. On inquiry I found he had cremated his fæces in the stove.

DR. KENNEDY, Des Moines, Iowa: We have two garbage crematories in Des Moines in addition to those referred to by Dr. Lindsley. Dr. Turner has one in connection with his water-closet; all urine and fæces go into it and are burned every ten days. One in the Capitol building is connected with the water-closet used by all the officers and employés in that building, and the matter is burned once a week. The odor is prevented by an inward draft from the seat of the closet. All gases and smoke generated in the weekly combustion are passed through a subsidiary fire and burned. One for dead animals is employed successfully. The expense is inconsiderable.

DR. LINDSLEY: In closing the discussion I would state that I simply brought it forward in order to secure the attention of physicians to this important question.

THE twenty universities of Germany conferred the degree of Doctor of Medicine on 847 candidates in 1886-87, as against 689 in 1885-86.