

sarcomata of the *brain* the duration of the majority of cases was from one to three months—the longest duration; and the shortest duration was four weeks. The large majority of cases of new growth in the viscera thus seem to terminate within a year from the appearance of distinct symptoms. In some cases, a period of doubtful health preceded the onset of undoubted illness, but this period I found so difficult to define that, as a safer assistance in determining the true duration of growth, I have drawn up a table of nine cases of what may be called external new growth (removed wholly or partially by operation). These show longer periods of time. Seven of them were cancers of the breast. A majority of the patients lived for from twenty-four to fifty-one months, and the shortest duration recorded was fifteen months. A man whose eye had been removed for melanotic sarcoma lived for forty-two months. The secondary growths in all the cases of carcinoma were widely distributed. Out of seven, the liver was infiltrated in five, the lung in four, the kidney in three, the spleen in two, and the heart, thyroid, and brain in one each. If it be supposed that after the operation only a very few morbid epithelial cells remained in the body, we have here a measure of how long they take to grow to a wide distribution—a period ranging from fifteen to fifty-one months. The intermediate durations are sufficiently near to make the mean a useful quantity. It is very nearly twenty-six months; or, omitting the single case of fifty-one months, somewhat more than twenty-one months. If this period be added to that determined by the symptoms, it seems likely that it may give an approximation to the true duration of the disease. For practical purposes, however, the determination of the observable period is far more important, and in every inquiry which we make as physicians practical usefulness to sick men ought to be our chief aim.

I hope that the observations recorded in this lecture, and the conclusions based upon them, are likely to be of use in diagnosis, as aiding in determining the probable situation and nature of internal new growths; in therapeutics, since treatment can only be safely based on an accurate diagnosis; and most, perhaps, in prognosis. In the Hippocratic writings, prognosis not only means the prediction of the event, but the prevision of the course of a disease and of all the probable incidents and opportunities of treatment likely to occur. I have tried to make this lecture a contribution to prognosis in this wider sense. The prognosis of our day is better than that of the Greeks, for it includes among its premisses the sure observations of morbid anatomy, and if Hippocrates could survey the practice of medicine as it now exists, I do not doubt that he would adhere to the opinion he expressed so many ages ago—that the most important thing for a physician is that he should practise forethought, and always have before his mind what has happened, what is happening, and what will happen in the case which he is treating. Τὸν ἰητρὸν δοκέει μοι ἀριστον εἶναι πρόνοιαν ἐπιτηδεύειν.

## THE "PERFECTED" EVACUATOR.

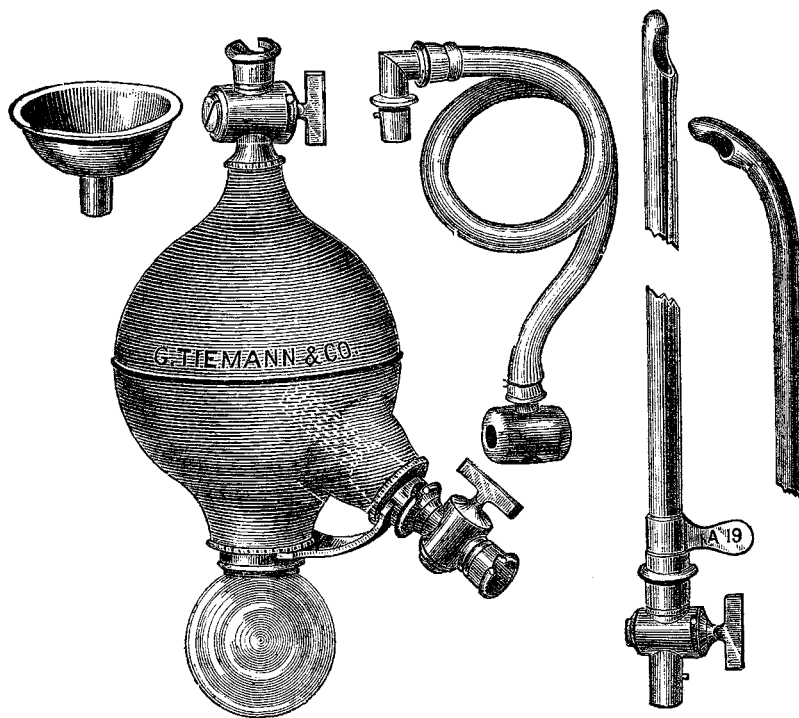
By FESSENDEN N. OTIS, M.D.,

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THE credit of conceiving and carrying to ultimate success the operation of removing stone from the bladder by lithotripsy at a single sitting is indisputably due to Professor Henry J. Bigelow of Boston. The method of crushing the stone has not materially changed from that pursued in former times, although we are indebted also to Professor Bigelow for more powerful lithotrites. These at once became a necessity when attacking the large and hard stones, which the field of his brilliant operation quickly embraced. With the heavier instruments now available it is rare indeed to find a stone which in skilled hands is beyond their compass. After the ability to use large evacuating tubes (from 25 mm. to 30 mm. in circumference, and even

larger) was demonstrated, the evacuation of the *débris* seemed easy of accomplishment. The first instrument, a modification of Clover's, devised by Professor Bigelow, answered the purpose admirably in the main, but was soon found to permit a return to the bladder of a portion of the *débris* after it had been deposited in the receiver—a fault which did not prevent the accomplishment of many notable successes by this method; but Professor Bigelow at once began a series of elaborate and expensive experiments to remove the difficulty. Sir Henry Thompson of London, who soon adopted Professor Bigelow's operation, and contrived instruments of his own for its accomplishment, found the same difficulty to contend with. A sharp rivalry between these distinguished surgeons—to construct an evacuator which should act by the most direct and shortest

FIG. 1.



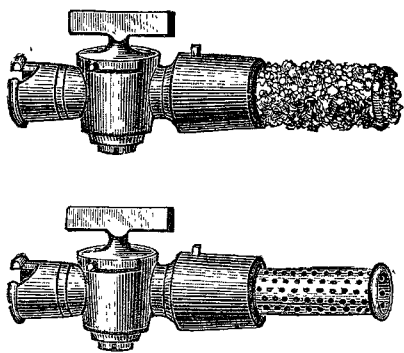
Professor Bigelow's latest evacuator (1883). Holds  $10\frac{1}{2}$  oz. Weighs 24 oz. (troy) empty,  $34\frac{1}{2}$  oz. filled.

route, and yet perfectly prevent the return of *débris* to the bladder—began in 1879, and for the several succeeding years furnished to the journals (chiefly the London LANCET) many interesting illustrations and much animated discussion. After various modifications and expedients had been adopted and discarded during a period of several years, Professor Bigelow, in 1883, presented the instrument, which has remained from that time up to the present (1889) without modification. In presenting his improved instrument to the profession in THE LANCET of Jan. 6th, 1883, Professor Bigelow says: "However otherwise arranged, a satisfactory aspirator should have some device near the catheter to act as a trap for *débris*, and secure every fragment that has passed it. The chief difference among evacuators now is in the certainty with which they retain the fragments they have aspirated. Any instrument will draw out the fragments, but few hold them securely, for the *débris* does not always fall into the glass receiver, nor does it always remain in it; on the contrary, it is easily carried back into the bladder. This defect in the action of the evacuator has received little attention from surgeons, although it is the only point connected with the instrument which offers any difficulty whatever. Until recently it has been remedied only by sacrificing simplicity in the apparatus."

In the latest instrument of Professor Bigelow (Fig. 1) the route to the bladder has been changed to correspond with that of Sir Henry Thompson, in which the evacuating tube was attached directly to the evacuator, without the intervention of tubing, as in Professor Bigelow's previous instruments, thus apparently giving both surgeons the advantage of the same and the shortest route to the bladder. In place of various contrivances, ball, valves, traps, and strainer of previous modifications, a perforated tube was inserted into the lower side of the rubber bulb, and continuous with a stopcock connected directly with the evacuating catheter. This perforated tube or strainer was claimed to

prevent effectually the return of *débris* into the bladder; and, in operation, it was proved to do so; but the strainer, while working perfectly in experiments with crushed coal or coral, when in practical use quickly became so clogged with mucus and coagulated blood that the frequent cleansing of the strainer during operation became necessary. This fact led Sir Henry Thompson to say, in THE LANCET (1883), that "all the perforated tubes and strainers get so blocked with *débris* (as I found long since) in the human bladder—not with coal in water—as to be practically useless there." As Professor Bigelow had, in THE LANCET of Jan. 6th, 1883, presented a large-sized woodcut illustrative of the absolute inability of Sir Henry Thompson's then latest instrument to prevent the return of *débris* to the bladder, with ample descriptive text, it might be suggested that his opinions of perforated tubes and strainers had been somewhat modified by personal feeling. The accompanying accurate copy of a photograph of the perforated tube or strainer of Professor Bigelow's improved evacuator, taken at the close of an operation at St. Luke's Hospital not long since, will, however, go far to justify Sir Henry Thompson's statement. (Fig. 2.)

FIG. 2.



Showing tube blocked with mucus and coagulated blood.

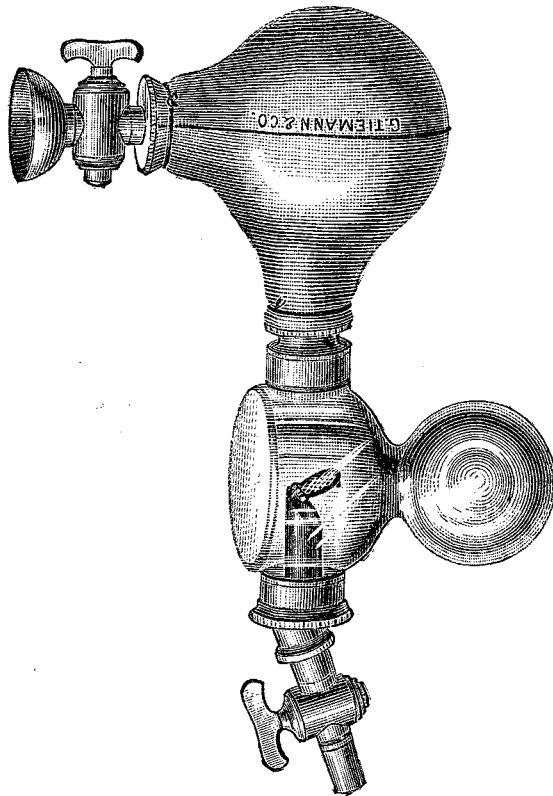
In cases free from mucus and pus, and perfectly free from any admixture of blood with the water during operation, there will not be any noteworthy difficulty; but if there is a trace of blood present in the progress of the procedure, the perforated tube will inevitably and promptly become blocked, as in Fig. 2. The instrument was a good one for practical purposes before the addition of the perforated tube; but it was open to the objection, as shown, that *débris* was likely to be left in the bladder after operations with it. Save under very favourable conditions, or by the frequent cleansing during operation, the objection evidently remains.

Sir Henry Thompson's experiments and modifications finally culminated in an evacuator which equally in action prevented the return of *débris*, without being open to the objections made against Professor Bigelow's instrument. This improved aspirator was presented in the London LANCET of April 12th, 1884. (Fig. 3.) "The improvement consists in a light, loosely-hanging valve of fine wire attached by a simple hinge to the end of the evacuating tube, which terminates within the glass trap of the instrument. When pressure is made on the indiarubber globe, and the current flows by the evacuating catheter into the bladder, this light valve is driven close to the aperture, and no *débris* can leave the glass trap. When the pressure is removed, and the current returns from the bladder, the valve floats widely open, and permits the *débris* to enter unchecked. The wire valve is circular in form, and its border, being flat and thin and about the tenth of an inch wide, is delicately sensitive to the movements of the current, and responds to the slightest impulse of the hand on the indiarubber globe." "But," Sir Henry Thompson further remarks, "I am quite satisfied that with my last published aspirator (the one so elaborately criticised by Professor Bigelow in THE LANCET of Jan. 6th, 1883), as well as with the form now described, no *débris* returns to the bladder if the instrument is properly used, when, of course, the valve is unnecessary. Few persons are aware that very slight but quickly-made pressure on the globe, sufficing to transmit only six or eight drachms of fluid into the bladder, generally removes more *débris* than a powerful impulse which transmits at one act all the fluid contents of the globe, or nearly so. When employed in the manner last named the valve becomes useful, and only then is it required."

At the commencement of the evacuator contest I was using very satisfactorily the original Bigelow instrument, and was, at the time of the notable discussion at the London International Congress of 1881, under the impression that it was the best then in use. During that discussion, Sir Henry Thompson accorded to me a fair share of the honour of contributing something towards the ultimate success of the operation of removal of vesical calculi at a single sitting. My distinguished countryman, Professor Bigelow, however, neglected to give me the credit of the previous discovery of the normal urethral calibre, through which alone the rapid evacuation became possible. Not desiring to assert my claim as a grievance, I determined, if possible, to invent another evacuator, and, in describing it, to write the history of evacuators in general; in this I proposed, while according honour where honour was due, to take what I believed to be my legitimate place in the preliminary history of litholapaxy.

Two years afterwards—viz., in November, 1883—I presented and demonstrated my first evacuator at a meeting of the New York Academy of Medicine, and read a paper in

FIG. 3.



Sir Henry Thompson's instrument (improved), 1889. Weighs 27½ oz. troy empty, 40 oz. filled.

which "the removal of *débris* from the bladder after lithotomy" was fully considered, with representations of previous instruments which had been in use for that purpose, adding those of my own, and in which, while it was distinctly shown that Professor Bigelow did not discover the increased capacity of the urethra, which alone made his operation possible, and also that he did not discover the tolerance of the bladder to prolonged instrumental interference, yet, as I there claimed, "he did much more—he utilised the knowledge which he, in common with other surgeons, possessed. He had the inspiration to conceive of its value as a factor in a great life-saving operation. He seized my demonstration of an average urethral calibre of 32 mm. in circumference. He joined it with his knowledge of the toleration of the bladder to legitimate surgical procedures, and litholapaxy was born. He had the courage, the surgical knowledge, the skill, the inventive mechanical genius, and the perseverance to carry it, *vi et armis*, to a successful maturity, thus finally achieving one of the most brilliant surgical triumphs of modern times."

My own instrument was constructed on an entirely different plan from those of both Professor Bigelow and Sir Henry Thompson. Having appreciated the difficulties of overcoming the alleged faults of both, I endeavoured to accomplish evacuation without return of the *débris*, independently of traps, valves, or strainers. This was effected by a simple breaking of the currents to and from the bladder, so that the *débris* should be released *in transitu*, and drop

down into a receiver arranged to be a perfectly dead point. (Fig. 4.)

In its practical working it was found fully equal in its evacuating power to the improved instrument of Bigelow, with the advantage that, without trap or strainer, no débris was returned to the bladder. It was found, however, that under circumstances where during the operation it became desirable to introduce an additional amount of water into the bladder this could only be effected with considerable inconvenience, much greater than in Professor Bigelow's

that a stopcock was not necessary to prevent the water from flowing from the evacuator, this being effected by atmospheric pressure alone in any position which the handling of the instrument required, and that only when laying it down was any water liable to run out. For use in this event a simple plug of hard rubber attached by a string was alone necessary. These important changes decreased the weight to such an extent that when filled my perfected evacuator weighed six ounces less than Professor Bigelow's when empty. The successful

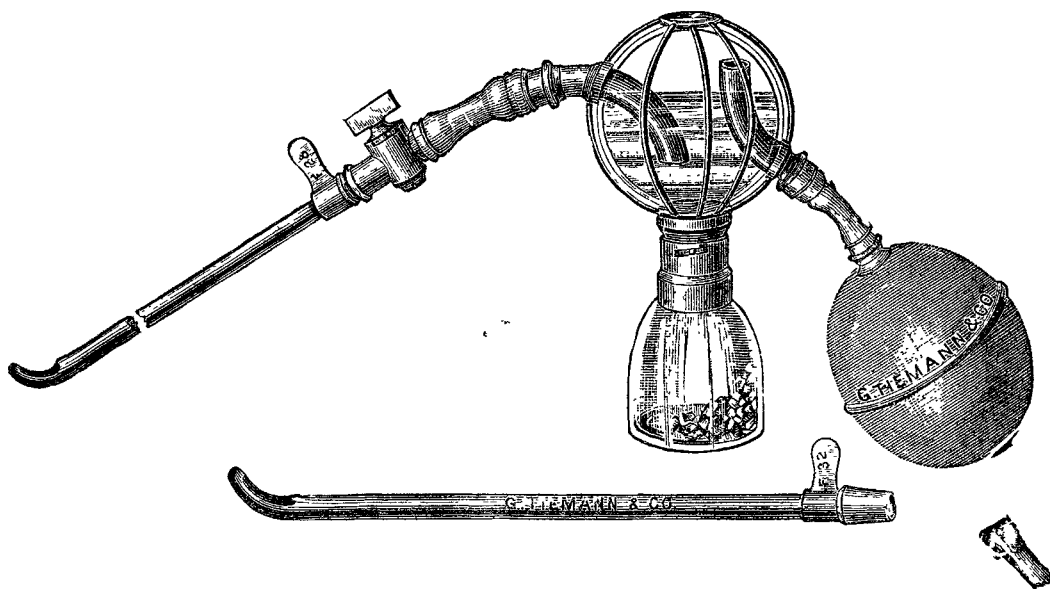
elimination of one stopcock, previously supposed to be the most important, and still absolutely essential in the instruments of both Prof. Bigelow and Sir Henry Thompson, directed attention to the possibility of getting rid of the remaining stopcock on the evacuating tube, which seemed desirable in order to prevent loss of water while attaching the evacuator to it after the crushing. It was ascertained in actual practice that, by changing the routine of operation a little, this stopcock was also wholly unnecessary. Instead of attaching the evacuator to the evacuating tube immediately upon its introduction into the bladder after crushing, the fluid was allowed to flow out, carrying with it all the fragments that could thus be washed out; then, deliberately attaching

the evacuator to the tube, the desired amount of water for working the instrument easily, was introduced by means of the Davidson's syringe, which was connected with the rubber bulb. The syringe was then attached and the evacuation deliberately proceeded with. It was not found necessary to press the end of the evacuating tube to the extent of depressing the bladder floor so as to make the portion with which it is in contact the lowest point, as advised in using the evacuator of Professor Bigelow, but the current was sufficiently strong to draw out the débris

if the tube was simply well introduced into the bladder cavity. Among the tests which were originally made to prove that the receiver was a perfectly dead point, and that fragments once deposited in it were thus entirely out of the influence of the currents passing to and fro during evacuation, was that of filling my evacuator completely as for ordinary use, then detaching the reservoir, emptying it, refilling it with glycerine, and then reconnecting it with the reservoir. A small quantity of crushed coral (which more nearly resembles vesical calculus than coal) was introduced into an ordinary soda-water bottle,

and this was half filled with water to which a little ink had been added. On working the bulb, the fluid thus coloured was seen to pass back and forth through the reservoir, but not in the least mixing with the glycerine, while the coral was drawn out of the bladder in the inky current, and, receiving its impulse and direction from the discharge-pipe, was disengaged from the coloured medium and, dropping down through the clear glycerine, was deposited at the bottom of the receiver. This experiment, which proves in a striking manner the perfect retention of the débris in the receiver during evacuation, was subsequently found to work admirably in actual practice; and, in all operations for the last two years where blood was present in sufficient quantity to obscure the fluid, I have used glycerine with great satisfaction. Without it, it

FIG. 4.

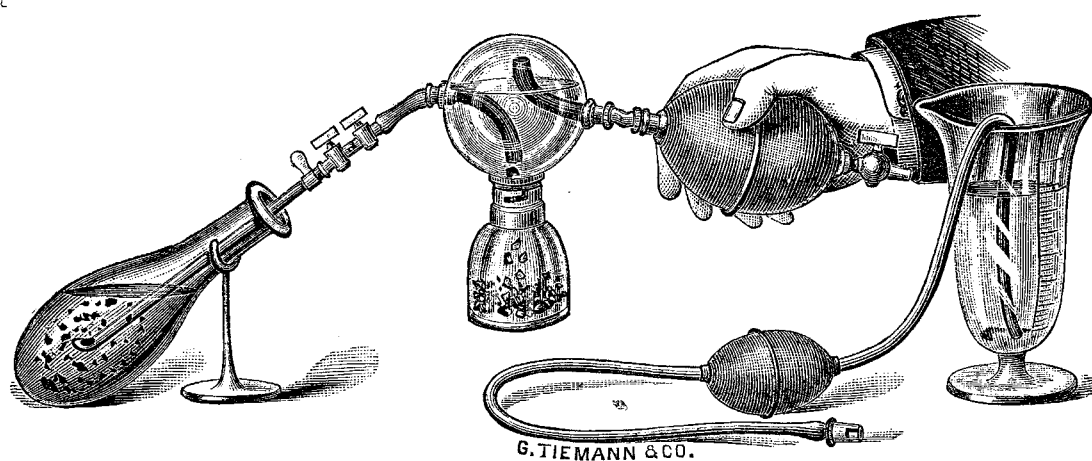


The original Otis evacuator.

or Sir Henry Thompson's instruments. In 1885, therefore, a tap and stopcock were added at the end of the rubber bulb, as shown in Fig. 5, so that, when it was found desirable to introduce additional water into the bladder, this was done with great ease by attaching the discharge pipe of the Davidson's syringe to a stopcock, while the supply end is immersed in a vessel (preferably a large glass graduate) filled with water at a proper temperature. The easy attachment and detachment of the Davidson's syringe allow any desired amount of fluid to be introduced into the bladder

BREA

FIG. 5.



The Otis evacuator, improved.

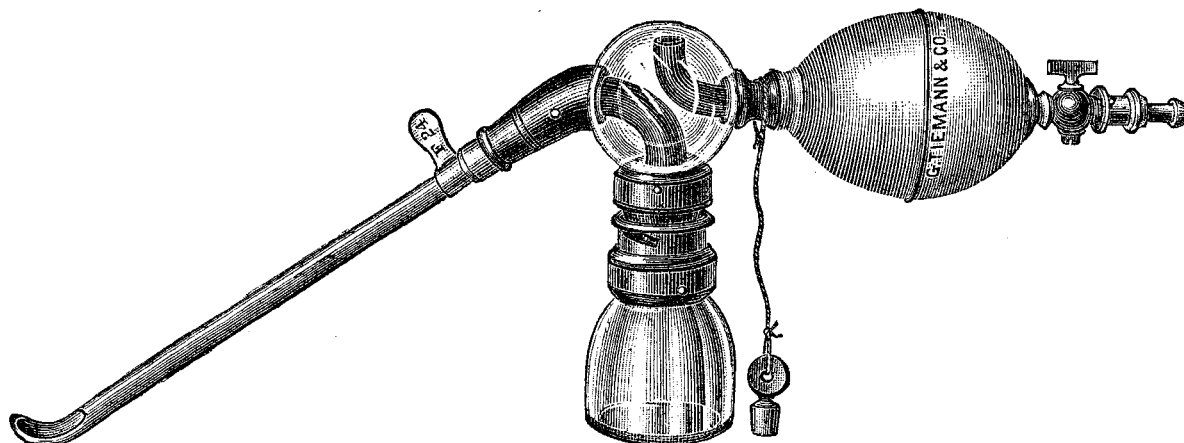
without delay or inconvenience. With this addition the instrument did most satisfactory service in my hands during the following two years. The only real embarrassment which was found in the use of this evacuator was from the weight and inconvenience of manipulation of the two stopcocks, which objection obtained equally in the instruments of Sir Henry Thompson and Professor Bigelow. At the suggestion of my son, Dr. Wm. K. Otis, who had noticed the greater lightness of the evacuator of Dr. Ultzmann of Vienna, I substituted hard rubber fittings similar to his; and in the course of experimentation which this change suggested, removal of all intermediate connexions between the glass reservoir, the rubber bulb, and the evacuating catheter was found to decrease the weight and add to the ease in handling the instrument. It was then discovered

will occasionally be difficult, and sometimes impossible, to tell whether the evacuation of the debris is proceeding satisfactorily without disengaging and emptying the receiver.

The changes which have been made in the old instrument are as follows:—1. Removal of all stopcocks. 2. Removal of tubing between the bulb and globe, and between the globe and evacuating tube, thus making the instrument more compact and the distance from the bladder to the

sents the following advantages over all other instruments now in use:—1. Perfect trapping of all fragments without the use of any form of valves, perforated tubes, or strainers. 2. Shortest possible route of fragments from the bladder to the receiver. 3. Absence of all stopcocks between the bladder and receiver. 4. Ease of filling and perfect control of the amount of water in the bladder during evacuation. 5. Lightness, compactness, power, and facility of manipulation. 6. The fragments being

FIG. 6.



The perfected Otis evacuator. Holds 8 oz. Weighs 10 oz. empty, 18 oz. filled.

receiver the shortest possible. 3. Introduction of hard rubber in place of metal wherever possible, giving the utmost lightness. 4. Making the tube apertures in the globe oval instead of round (Dr. W. K. Otis's suggestion), and thus giving the greatest security against their fitting loosely and leaking. 5. Increasing the calibre of the evacuating tube where it enters the globe, thus securing a greater rapidity in delivery.

It is now claimed that this latest evacuator (Fig. 6) pre-

visible from the moment of leaving the tube until removed from the receiver, it can be seen that they do not return to the bladder.

I may state that the original Otis evacuator was manufactured by Messrs. George Tiemann and Co. (surgical instrument makers of New York), who with much pains and skill have aided me in the succeeding changes necessary to bring the instrument finally to its present state of perfection.

New York.

## A STUDY ON LEPROSY:

BEING A SUMMARY OF OBSERVATIONS MADE DURING A RESIDENCE IN PALESTINE.<sup>1</sup>

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Translated by EDWARD ATKINSON, *Honorary Surgeon to the General Infirmary at Leeds.*

AN article of such a nature as I here present to dermatologists, specialists, and philanthropists cannot pretend to be a scientific dissertation, or even a complete recital of all the phases which the horrible malady with which we are about to concern ourselves passes through. My aim is infinitely more modest. I desire, as simply as possible, to impart to my colleagues the observations and experiences which I have made during my residence in Palestine, and at the same time to gain the attention of both colleagues and philanthropists to the possibility there may be of combating with success the terrible scourge of leprosy.

The disease which bears the name of "leprosy" has been known from the most remote times. We find already in the Bible indications and data, more or less exact, of the leprosy called the "white,"<sup>2</sup> *morphæa*, *alba*, *mosaica*, and also of the leprosy named "tuberculous," *nodosa*, *tuberculosa*, *mutilans*,<sup>3</sup> also in Celsus,<sup>4</sup> and Pliny's *Lucretia*. Nowadays, one meets in Palestine and at Jerusalem (excepting only rare and isolated cases) with none but the tuberculous, mutilating leprosy, accompanied, according to the individual case, with anæsthesia or analgesia. Notwithstanding the total absence in Palestine of medical statistics, it is allowable to estimate at about 600 the number of lepers inhabiting the towns and villages of this

country. At Jerusalem they live in common in a domicile assigned to them by the municipality. Immediately that symptoms of leprosy are apparent in a person he is promptly excluded from his village, separated from his family, and must go to the nearest town, in order to live on alms and on what his relatives bring to him. It happened formerly that some individuals suffering from another malady—e.g., from syphilis,—but accused by their enemies of being leprosy, were doomed to expatriation. Such events no longer occur, because when a similar case arises the inculpatum submits himself to examination by the doctors. There exists at Jerusalem a large hospice for lepers, founded under the auspices of the Moravian Brethren, and destined to collect together, if possible, all the lepers of the country, with the intention of bringing about the disappearance of this affection by means of a process of exclusion and isolation. The founders and patrons of this institute hope to attain their end, which, however, is rather philanthropic and religious than scientific. It is, at the same time, useful to draw attention to the fact that, as the Government has no intention to let these poor unfortunates be shut up, or to separate married people by force, this great establishment has but a very limited *clientèle*, amongst which there are also some syphilitic cases. As to my opinion, I am obliged to declare that the result of my researches gives me the conviction that leprosy is by no means contagious, and that consequently the exclusion and isolation of the patients is both a useless and a cruel measure. If leprosy were contagious in the sense in which one understands it, the staff of the above-named hospice, where men and women devote themselves to the care of the lepers, would be likely to suffer from this daily contact, dressing of wounds, washing of linen, &c. During the twenty-five years the hospice has existed not one of the *employés* has suffered either from any infection or any contagion whatever. Since the existence of this hospice, and by the example given to the public of not fearing the leprosy, lepers are permitted to enter the towns and the bazaars, and it has not been proved that there is any increase of leprosy. The same fact is pointed to in numerous places in the East, where leprosy ought to be followed by an excessive propagation among the lower classes if it were truly contagious. Eleven years ago I had

<sup>1</sup> "Étude sur la Lèpre: résumé des Observations faites pendant un séjour en Palestine." Par le Dr. M. Sandreczki. Published in the "Revue Médico-Pharmaceutique," Constantinople, April 30th.

<sup>2</sup> 2 Kings v., 27; Exodus iv., 6; Numbers xii., 10; Leviticus xiii., &c.

<sup>3</sup> Deut. xxviii., 27.

<sup>4</sup> Lib. iii., c. 25.