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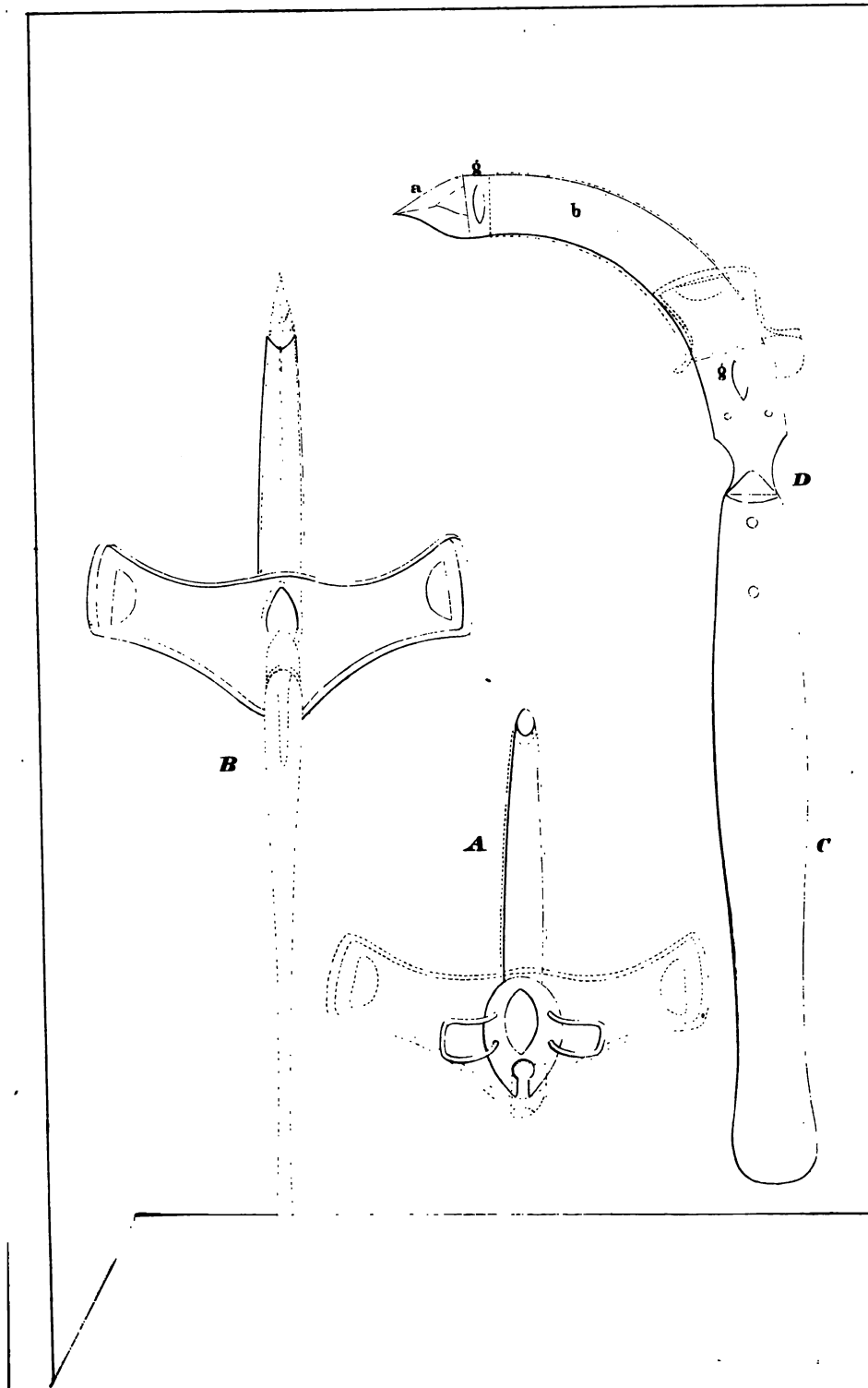
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TRACHEOTOMY,  
AS APPLICABLE TO  
DIPHTHERITIS,  
OR, THE  
THROAT DISEASE  
OF  
CALIFORNIA.

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AN EXTRACT FROM THE TRANSACTIONS OF THE MEDICAL  
SOCIETY OF THE STATE OF CALIFORNIA,  
CONVENTION OF FEBRUARY, 1858.

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BY ARTHUR B. STOUT, M. D.

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## TRACHEOTOMY.

BY ARTHUR B. STOUT, M. D.

EXTRACT FROM THE TRANSACTIONS OF THE MEDICAL SOCIETY  
OF THE STATE OF CALIFORNIA, CONVENTION OF  
FEBRUARY, 1858.

NO SURGICAL operation, the discussion of whose merits involves the interests of California, presents at the present time more importance than that of Tracheotomy. The great prevalence of throat diseases, as they may be collectively called, during infancy, as well as among adults, their terrible fatality, their obstinacy to treatment under the assiduous care of the most learned and skilful, as well as in the hands of pretenders, theorists or specialists: the alarm and grief which attend their epidemic invasion, all combine to render throat diseases the most important subject of study which our young State of California presents. Political economy, as well as domestic happiness, appeals to the profession for their investigation, and as far as human intelligence may reach, the solution of their mysterious problem.

The rapidly increasing youth of the country is the dependence of California for the sterling portion of its future population. The State expends its wealth, and its people are taxed, to educate to the highest possible degree, this precocious youth. It is this juvenile population, educated in American political, religious and social ideas, upon which the State relies, to refine and exalt the crude and heterogenous elements which flow from foreign people to cover the land. At the alarm of throat disease in our cities, families already settled seek to fly; at the report of their general existence, families about to emigrate change their determination; and families already formed in the State are in a few days abruptly reduced to the parent stock.

It is in this young host, the flower of the State, that throat diseases rage fearfully to thin the number. Whatever, then, may contribute to elucidate the question involved, and save from destruction a portion, even a few of this precious class when struck by the disease, must possess an interest to this Convention; and invites members from every county in the State more seriously to collect and report the phenomena and results of treatment which their localities may afford. It is proper that through this Convention the public should learn that the profession so universally sustained in the State to the preference of all intrud-

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ing dogmas, occupies itself faithfully in studying its interest; in promoting science with practicable available knowledge; and without cant or secrecy or patent rights, freely opens to the world its budget of attainments and discoveries.

Previously to discussing Tracheotomy as an important auxiliary in the treatment of throat diseases, it will be necessary to take a general view of their pathology in their epidemic or sporadic varieties. All admit that at times certain emanations, the precise nature of which is yet unknown, arise from the earth and infect or poison the atmosphere, so as to render it impure for respiration, and give rise to diseases which, according to the extent of their prevalence are called epidemic, endemic or sporadic. These emanations are called by the general term, *miasmata* or *malaria*, and so denominated for the want of a more definite or descriptive name. It is peculiar of California that malaria are generated at all seasons of the year. Its general mild climate permits that constant process of decomposition or recombination of vegetable matters, from which those emanations are supposed to have their origin; while on the contrary their production in other countries is limited to certain well recognized seasons of the year, when their recurrence may be always foretold.

If, however, the climate favor their constant appearance, it may be accredited to its advantage that the quantity, except under extraordinary circumstances, is less. The period required to infect the system sufficiently to manifest itself by positive disease, is longer; and also from the otherwise invigorating character of our climate and the hardy strength of a new and young population, the resisting power to its poisoning influence is greater. Hence it is in California that the shades and modifications of malarious disease have a much wider range than elsewhere, and present such a long series of protean forms. Their wide range extends indeed from that peculiar form of malarious infection, which, while it enervates the whole system and visibly alters the general aspect of an individual, without expressing itself in any special symptoms of fever or local disease, yet deprives him of his natural well being, passes through the varieties of neuralgia, chills and fever, special febrile and local diseases, more or less severe and fatal, the fearful typhoid fever, up to the lightning-like attack of malarious gastro-enteritis, or cholera. It may be contested that a definite poison should give rise regularly to definite symptoms, or that the same cause should steadily produce the same effects. But to account for all these modifications which group themselves around one general cause, we can only in the absence of an absolute known and indisputable reason, seek to explain them by admitting on the one side modifications or species of the poisoning element, in like manner as the narcotic family of plants presents its varieties, having generally similar but yet distinguishing properties. On the other hand may be allowed in explanation, the diversities of age, hereditary constitution, mode of life, general diet, and place of residence, and in fact, analagous to the circumstance, that where a number of individuals eat of some deleterious food, some are

attacked with severe urticaria, some with colic, others with fever—some with emesis, and others with simple dysentery.

The patient observer will nevertheless not fail to perceive a general group of phenomena accompanying all these varieties, guiding and controlling these local manifestations, and being the master spirit of the disease, which must be vanquished before true convalescence can be secured. Even though local symptoms yield in acuteness, and seem to promise an early cure, they beguile the deluded attendant into an abatement of zeal, and into errors of prognosis which procure for him nothing but censure. It is to the neglect of this circumstance that must be attributed many of the relapses of these diseases—and as regards the subject we have yet to treat of, the main reason why Tracheotomy counts so many failures.

When we study the regular but gradual introduction into the animal economy of the poison, we soon find a steady deterioration in the nervous energy and vitality of the individual; the flush, vigor and vivacity of health is exchanged for the pale, sallow aspect, the gradually increasing anæmia, and the mental languor which mark this infection. The blood is early contaminated. The precise changes it undergoes are unknown, yet in the general alteration of all the humors or fluids of the system, it becomes evident that none of the organs receive their normal nutrition. Soon upon this state follows the train of general positive symptoms, periodic fever, with its fluctuations of cold and heat, and the thousand different phases of the intermittent neuralgia. It is the constant attendance of these general periodic phenomena, sometimes obscure, sometimes clearly apparent, which distinguish the local manifestations which next ensue in their turn, from the simple diseases without infection, which are named according to the organ they assail.

The special intention of this paper does not permit a lengthy discussion of these different manifestations of the same poisonous agency—the malarious erysipelas, which occasionally occurs, so frequently fatal when treated by the general antiphlogistic directions laid down in the books, but so constantly cured when the same treatment, with the addition of the recognized antidote to the epidemic poisons, is employed; the malarious gastro enteritis, so often styled imported Asiatic Cholera; the malarious fever, with complication of cutaneous eruption, called scarlatina, and several other forms which have given rise to much discussion, and still worse, spread terror wherever they have appeared, might all be here included together and elucidate the investigation. It suffices to state, that after the primary and essential infection of the system, the disease manifests its progress by a disposition to localize itself on some special organ of the body. The new symptoms thus developed appear with suddenness and violence, and by their acuteness so arrest the attention, that they come to be looked upon as the only disease to be treated. In the public view, it is the only disease appreciated, named or spoken of, and of which the patient is declared to have died or recovered, as the result may be. Important as



these local symptoms may be, all the more commanding the use of active remedies, as they generally assail some vital organ—the brain, the lungs, the digestive organs, or the throat, etc.—it is yet evident they are but a supervening secondary disease, the cure of which can only be accomplished successfully when the more important primary disease, the *malarious intoxication*, can be simultaneously controlled. Laying aside, then, all these various forms, more properly referable to another treatise, I proceed to examine very briefly the complication of malarious infection which comes under the head of throat diseases.

#### THROAT DISEASES.

When the invasion of the disease manifests itself in the throat, the pathological local varieties present almost as long a catalogue as the series of localizations above alluded to. The varieties in pathological character extend from the erythematous blush discovered in the back part of the throat, to oedematous, inflammatory, suppurative; ulcerative, with foetid sloughing; pseudo membranous, with or without ulceration, or there may be only a spasmodic croup, without any disorganization of tissue. These different phases have given rise to much division of opinion and discussion, and we find enumerated in authors a tiresome list, both in regard to the form as well as the locality.

Pharyngitis, with enlargement, sup- puration, ulceration, or oedema of the tonsils, and glottis, and uvula, one or all;	Hooping Cough; Inflammation of the throat, with glandular enlargement of sub- maxillary or cervical glands;
Laryngitis, pseudo membranous, or croup;	Inflammation of the throat, with parotitis, mumps;
Laryngitis, without false membrane;	Diphtheritis.
Laryngitis, spasmodic;	

As a term to express all the modifications, and simplify to the utmost the conflicting appearances, Diphtheritis is coming now into general use, and it is certainly desirable to have one general technical term of expression, and leave the name of Throat disease for general use. Omitting, then, Parotitis, we should have:

Diphtheritis, pseudo membranosa;	Diphtheritis, ulcero gangrenosa;
Diphtheritis, adematosa;	Diphtheritis, cutanea;
Diphtheritis, erythematosa;	Diphtheritis, spasmodica;

Or, if preferred to refer especially to the locality chiefly affected, we should have:

Diphtheritis, pharyngea;	Diphtheritis, glandulosa, etc.
Diphtheritis, laryngo trachealis;	

It would be useless in the present place to enter into the details of all these varieties. Their characteristics, minute pathology and therapeutics have been admirably set forth by French, English and American authors of eminence. To the works of Rilliet and Barthez, which contains a fine compendium of the experience of Bretonneau, Trou-

seau, Valleix, Bouchut and others, and to West, the able representative of the English school, reference may be made for the fullest information. But it is in vain that we search all these authors to find the proper stress laid upon the specific element which presides over the whole of them. In their nice distinctions of kind and locality, they confuse and complicate the pathological question, and only glance cursorily at the great key of the mystery, the general malarious impoisonment of the whole system.

"It will but skin and film the ulcerous place  
While rank corruption, mining all within  
Infects unseen." [HAMLET, ACT III., SCENE IV.]

This state is manifest in the prodromena or premonitory symptoms of throat disease. A febrile condition exists for several days which is not the febrile irritation produced by a local inflammation, because it precedes any local manifestation of disease. It is therefore a fever of another nature. It is the fever which announces that the infection of the system is nearly complete, and which precedes by an indefinite number of hours the announcement of the saturation of the system with the noxious element, and the explosion of the local symptoms. Throughout the prevalence of these acute local phenomena, it is easy to trace the daily ebb and flow of a peculiar remittent fever, and also observe it after they have subsided. And it is in the congestive cold stage of this fever that so often terminates a life which has been pronounced saved, and out of danger. In very young infants it is not easy to observe these fluctuations of the fever, for they are generally so warmly clad and carefully nursed that the temperature of the skin is preserved warm, even in the cold period of the fever. The congestion generally occurs between midnight and morning, is generally sudden in its invasion, and often attended with a convulsion. It is, however, certain that in some cases death does not occur during a sudden local congestion, but by a gradual exhaustion of the vital powers and deperdition of the nervous energy.

How strikingly is this opinion corroborated and sustained when we hear physicians declare that they have succeeded in relieving the throat symptoms, that they had held out the encouragement of commencing convalescence, when at night they have been suddenly aroused to see their patient die of a sudden congestion of the brain or other fatal and unexpected termination; or have arrived in the morning anticipating the progress of convalescence, to find the little patient dressed in the garb of the grave.

So profoundly has the nervous function been altered, and the fluids of the body so thoroughly envenomed, that long before the skill of the physician can eliminate them from the system and replace them by healthy nerve power and normal secretions, the endurance of the patient is wasted, and he quietly passes from life to death, without a struggle and without a pang. These are terminations which occur from two to six or eight days after the throat symptoms have been controlled, and have ceased to be the subject of primary solicitude.



## TREATMENT.

I approach the end of my task in arriving at the treatment of these diseases. So long as the absolute nature of the poison is unknown, so long will there be certain vagueness in the search for its antidote. The same as with other poisons, too large a dose may be received to permit of its eradication. Oftentimes from the impracticability of moving the patient, the poison is entering the system at the same time with the antidote—with the difference, that the former is introduced with every breath of air inspired, while the remedy can only enter at stated intervals; in other words, the poison has the more steady chance in the race. If, however, my preceding argument be admitted, it is clear that the key of the treatment consists in finding the antagonizing antidote to the poisonous infection. The indications are evidently to eliminate the enervating poison, and sustain the powers of life until the morbid excretions and secretions of life's nutrition can be exchanged for those that are healthy, and the brain can produce the normal nerve power. This process often requires much time, for it is almost equivalent, where the infection has been by slow degrees, to taking down all the organs of the system and putting up new ones. There are instances of slow infection, in which the general aspect of the individual shows there is not a healthy fibre in his body, and that every tissue must be regenerated before he can be restored to health. I would have the treatment then, in general terms, as follows:

1. Change the atmosphere of the patient, to exclude the admission of more poison.
2. Introduce from the outset the best known antidotes to the infection.
3. Eliminate it by proper evacuants from the system.
4. Introduce good nourishment, to make good healthy tissue in place of that removed by the treatment.
5. Combat the secondary local symptoms by the most vigorous known remedies.
6. Obviate suffocation by tracheotomy, to gain time for the accomplishment of the former indications.
7. Watch for any local congestions, as of the brain, which may occur, to hasten with relief to the assailed organ.

Inasmuch as the degree of infection in each special case admits of no precise measure, it is impossible to prognosticate which cases of the disease, however severe they may appear at the onset, are destined to prove incurable, nor which, when they seem of a milder type, may not yet eventuate in the same fatality. The practitioner can only hope, and maintain with death the contest until it be positively won or lost. In this view, he will carry out the preceding indications as nearly as may be, in the following manner: The patient should be removed, if possible, to another locality; or as an approximation to this change, from a basement to a first or second story, always seeking as elevated an atmosphere as circumstances may permit. The best accredited an-

tidote to the malarial infection are quinine and iron, etc. Those remedies, then, one or both, or the nearest to a specific of that class, should at once enter into combination with those general evacuants and local discutients as the judgment of the practitioner and the nature of the case suggest. The general and local evacuants—the treatment by diaphoresis, by alteratives, and the intervention of stimulants, are all details so amply and ably presented in the books, that it would be idle on my part to repeat them. In these matters physicians always do and always will select for themselves. But in regard to the specific antidote resorted to, it may be urged that there may be yet some one in reserve for future discovery, more potent than those we now possess. As quinine at times fails in simple intermittents and neuralgiæ, so in throat diseases does it seem at times inefficient. There is some modification in the poisoning agent which demands a corresponding modification in the antidote addressed to it. But as yet quinine offers the nearest approach; and the addition of iron when the first acuteness of the symptoms has been overcome, I think of great advantage. The best evidence I can give, not only of the curative but the prophylactic efficacy of quinine and iron, is in the cases we constantly meet in the city and in the environs, of anæmic looking children, with slight intermittent fever prevailing at night, and slight glandular swellings of the neck, when these remedies give them immediate relief. It is a state resembling scrofulosis, which is found in the strongest families, but which if persistent without cure might convert a good constitution into a scrofulous habit, and which in reality only represents a partial general infection of the system. It is in this condition of system that diphtheritis makes its attack; and we can pretend to imagine, without offering proofs, that many a case of diphtheritis has been averted by the timely treatment of this condition with quinine and iron. While now the practitioner is using these means to antagonize the poison and expel it from the system, it is evident he should provide for the inevitable waste of tissue which must occur, by the introduction of good nourishment to supply new tissue, or exhaustion will intercept the best directed course of treatment. I consider milk, with broth of meat, and wine when necessary, as proper to fulfill this requirement. Quinine may counteract the poison and give recuperative tone to the tissue present, but it cannot supply new fibre for that which disease and medicine have removed or wasted. By such a treatment vigorously enjoined, the first five of my general indications are covered.

It now remains to give to Tracheotomy its proper appreciation, place and value among the therapeutical agents employed. Tracheotomy is in disrepute. Its history, of ancient and modern date, shows how often it has come in vogue, to be again relinquished; but yet it shows, also, how earnestly in the hour of danger it is appealed to for relief, and how gladly it would be generally adopted if its use could be resorted to under circumstances which promised a more flattering hope. The operation appears to have lost its character, less from its own demerit, than from having been found in bad company. The authors



who have treated of it have for the most part pictured the operation as the forlorn hope of the treatment; have described it at the close of their plaints at the incurability of the disease, and when surgeons have performed it they have considered that their task was done, and that the operation was little else than the grand finale of the tragedy. The extended experience of French surgeons has done much to dispel the error, and I entertain the hope that I may re-establish for Tracheotomy its merited reputation, by endeavoring to fix its true value in the general treatment of diphtheritis. If my ideas of the nature and consequent treatment of the disease are admitted, my object is at once attained, for the operation allows a greater length of time under vastly improved circumstances to eliminate the poison from the system, and introduce new structure into the various organs and tissues of the body. The operation is only a means to an end, and not the ultimate resort. It is chiefly after its performance that we recommence, with the operation as our powerful auxiliary, the real contest with the disease. In the ulcerative and putrid sore throat there are some who think that the disease becomes fatal by the immediate absorption through the lungs of the emanations from the diseased surface. It may be an aggravation of the original infection, and hasten the utter corruption of the humors of the body; but without pausing to argue this point, does not Tracheotomy at once isolate this additional evil? When the breath no longer passes over the contaminating surface, have we not made another valuable step in the rescue of our patient? We have struck at the root of disease. The various specific diseases of the throat have this in common with simple inflammations, that they are aggravated by constant motion of the organ and the friction of any mechanical irritant, and are alleviated in proportion as such aggravations of the local affection are removed or allayed. The operation of Tracheotomy subserves most admirably the purpose. Inasmuch as the patient no longer breathes by the larynx, all the organs are put at rest, and in their absolute inaction offer the utmost advantage to the action of local applications. The reason now becomes apparent why the operation should be performed early, and why parents should correct their fear and alarm when it is proposed. They should learn rather to hasten the surgeon to its fulfillment, than encourage him to procrastinate.

A general malarious infection of the system, with its concomitant depressing influence, and its exhausting febrile reaction, are together cause sufficient to wear out life; but when thereto is superadded a local specific malady of the throat, a new set of destructive phenomena follows. The moment the function of respiration is assailed, that moment a series of enervating influences commences. The swelling of the throat diminishes the access of air to the lungs. To supply the want the respiration becomes hastened. Immediately both a physiological and physical effect is established—physiologically because the too rapid admission and expulsion of the air from the lungs prevents the due decarbonization and oxigenation of the blood—the operation

being too rapid for the proper chemical changes to ensue; and physically, because the accelerated motion is too rapid for the powers of life to maintain. Thus I explain an entirely new intercurrent and supervening group of death-working influences. The relief which Tracheotomy brings to these pathological and physical agents is prompt and positive. Pure air at a regulated temperature and in sufficient quantity, is instantly admitted to the lungs, and the quantity is supplied in proportion to the demand. Hence the purest blood and a plenty of it, is immediately distributed to give nutrition to every fibre of the body. Secondly, the quantity of air being admitted *ad libitum* the lungs may resume their quiet, normal movement, and all the physical fatigue of accelerated motion be at once relieved. The proof of this doctrine is brilliant and decisive. Open but the trachea of an asphyxiated, suffocating infant, and wait a moment to see the first symptoms of suffocation, of cerebral congestion, of syncope, or of hemorrhage transpire, and then witness the thankful air of relief which follows—the grateful eye-glance of content which passes from the child to the parent, and the sweet calm which enters the sick room, both for patient and for parent, as the threatened agonizing suffocation is exchanged for repose, and no one will longer doubt the propriety, nay the triumph of Tracheotomy.

When this operation is quickly and successfully performed, and no immediate disagreeable events intervene, such as hemorrhage, or convulsion, or syncope, etc., it is truly surprising to observe the transition from impending suffocation to the calm of repose which follows. Liquids which previously were administered with difficulty, or were rejected, are immediately taken with avidity, the patient willingly extending its hand to obtain the longed-for refreshment. Next follows a gentle, undisturbed slumber, the natural relief for the long endured fatigue of accelerated and difficult respiration. These first effects obtained, next ensues the attendant's opportunity to treat the disease and renew the introduction, which now meets with no physical local obstruction, of the well known remedies. So far, then, from Tracheotomy being the forlorn hope of the treatment, it is in fact but the signal for a new onset upon the disease.

When the disadvantages are considered under which the operation is performed, as presented by most authors for adoption, it is not to be wondered at that it should fail in its object and be rejected. After the infectious poison has had but feebly disputed sway of the system to the last moment, when the fluids have become deteriorated to the utmost, and when the mechanical struggle to accomplish the act of respiration has exhausted the physical force to the last extreme, Tracheotomy is attempted. The necessity of rapidity in its execution, and the confusion which prevails, leads to inexpertness in its performance, and oftentimes the last strength of the infant is wasted in the spasmodic struggles which occur at the time of the introduction of the canula. Strength is wanted to expel from the tube the blood mucous or membranous tissue which present, and a new contest commences to keep



the tube clear from obstructions. It, nevertheless, in the face of all these objections, seldom fails to give relief, and a respite from suffering. Life is protracted from three or four hours to three or four days, even in cases which, under the most sagacious care, are destined to perish, and an immediate death of agony is exchanged for a placid euthanasia. But it is these few hours of precious respite which the physician seizes to win his object. How often does it happen that only a few hours are needed to saturate the infection with its antidote, and reach the crisis of convalescence which the local asphyxia denies us—but Tracheotomy gives not only three or four hours, but oftentimes as many days. And when indeed disappointment does follow all our toil, death ensues not from throat disease, but the general malady under consideration. I feel, therefore, free to maintain that if Tracheotomy be resorted to so soon as the first symptoms of asphyxia appear, and be then used only as an auxiliary to gain time for the active administration of other remedies, the statistics of the operation will yield a far more favorable report.

We have heard a physician exclaim, that he would never perform Tracheotomy. Why? Because the operation can only remove a physical local obstruction; there is an element in the disease which affects profoundly the nervous system, and as the operation cannot reach this, it can be of no avail. The same authority, however, in describing an operation of which he had cognizance, stated: "the child when operated upon was in a state of asphyxia. Immediately after the operation the most agreeable calm ensued, and the child lived, promising recovery, for two days, when it suddenly died." This authority thought the reported cures after Tracheotomy were wrongly attributed to the operation, but were of that less degree of acuteness which would have permitted cure without any surgical intervention. It was barely possible, considering the mortality of the disease, that he was in the right, but it was an unfair assumption when the opposite view might be supported with more probability. He yet admitted enough to overturn his own opinion.

In the "Operative Surgery of H. M. Smith," vol. 3, p. 261, ed. 1852, are the following statistics of Tracheotomy for croup:

OPERATOR.	OPERATIONS.	CURED.	DIED.
Amusat .....	7	1	6
Baudelocque .....	15	0	15
Blandin .....	5	0	5
Gerdy .....	6	4	2
Guersent .....	9	0	9
Maslieurat .....	2	1	1
Petit .....	6	3	3
Roux .....	4	0	4
Velpeau .....	6	0	6
Trousseau .....	153	41	112
Pancoast .....	7	3	4
Page .....	1	0	1
Smith .....	1	0	1
	222	58	169

OPERATOR.	OPERATIONS.	CURED.	DIED.
	222	53	169
Thompson .....	1	0	1
E. Atlee .....	1	0	1
Townsend .....	1	0	1
Van Buren .....	1	0	1
Buck, Jr. ....	1	1	0
Johnson.....	1	0	1
	<hr/>	<hr/>	<hr/>
	228	54	174

Smith adds that in these cases the operation was resorted to only when nearly every other means had been tried. In Smith's report of 29 operations performed for the removal of foreign bodies where the trachea was not diseased, only one had a fatal result.

Whether this great difference in the results of operation upon a diseased or healthy trachea, continues Dr. Smith, is owing to the changes produced by the disease, or whether it is the result of an incision in an inflamed instead of a healthy structure, or whether it is not owing to the delay usually attending the performance of the operation, can only be settled by each operator hereafter specifying the peculiarities of his cases.

Dr. Badarous has kindly furnished the following report of Dr. André, from the December number of the *Lancet*, giving the results of Tracheotomy for croup, at the Children's Hospital, Paris, during 1856:

AGE.	No. PATIENTS.	DEATHS.		RECOVERIES.	
		Boys.	Girls.	Boys.	Girls.
From 15 months to 2 years .....	6	2	4	0	0
2 to 3 years .....	9	4	3	2	0
4 years .....	13	5	4	4	0
4 to 5 years .....	11	6	3	1	1
5 to 6 years .....	6	3	1	1	1
6 to 6½ years .....	3	1	1	0	1
7 years .....	2	0	1	0	1
8 years .....	2	0	1	1	0
9 years .....	1	0	0	1	0
9½ years .....	1	0	0	0	1
Total .....	54	21	18	10	5

Thus of 54 operations, 39 were lost, and 15 saved.

Bouchut in his recent "Treatise on the Diseases of Children," (see Bird's Translation, London, 1855, p. 279,) gives the following statement: "Although the success of Tracheotomy is not very brilliant, the results are, however, such that they ought to encourage the medical attendant of a child half asphyxiated with croup. M. Bretonneau, out of twenty operations, has saved six children; out of one hundred and sixty, I have saved *forty-five*. M. Leclerc, (of Tours,) who has adopted the same treatment, reckons one successful in two operations he has performed. M. Velpeau has cured two children in ten. M. Petel, (de Caleau Cambrésis,) who has followed the same steps, has performed three successful operations out of six he has attempted. Thus, in 198 operations of Tracheotomy, 57 successful cases may be reckoned; that is to say, a little more than one-fourth."



Again, in the Translator's note, he says: "Guersant has operated 150 times. The earlier cases were less successful than the latter; 13 of the last 50, private cases, and 13 of the last 31, hospital cases, recovered; or at the rate of 36.62 per cent. In M. Guersant we have a good convert to the cause of Tracheotomy, as it was a long time before he could be induced to admit it in his hospital."

We have then in enumeration the simplicity of the operation when expertly performed; the readiness with which the trachea closes and heals after it; the almost universal success of it when performed for the extraction of foreign bodies, or after injuries, and the salvation of 15 cases in 57 cases in croup, where the operation was done under the most unfavorable circumstances, and on an empoisoned system. Before such facts the surgeon is not justified in refusing the chance which Tracheotomy offers of delivery. Since it is known that the infection of miasm is curable, and that patients have survived the most profound collapse when their fate seemed sealed, we cannot by any possibility declare how many or how few more hours of care and medication may suffice to attain a favorable crisis. A single hour or a single dose of medicine more may be all that is wanted to effect the change. If, then, Tracheotomy will gain that time, the physician's duty is to use all his energy to obtain it. Before such a statement we cease to hunt the books for more authority or statistics, and feel assured that the registry of California will show still more favorable statistics when Tracheotomy is done in accordance with the views as here stated.

The most difficult and embarrassing moment of Tracheotomy is the introduction of the tube after the incision is made in the trachea. The sudden entrance into the air passages of air and blood, the efforts of spasmodic respiration, the influence of the brain in its transition from congestion to its natural state, in bringing about syncope, and the expulsion of adventitious substances from the trachea by the new exit, all together create an alarming crisis, anything but agreeable to those present at the operation. It is in the hope of diminishing and surmounting these difficulties, that the instrument herewith presented for inspection, has been devised. It consists of the double canula already in use, but materially modified in form. To introduce through the incision into the trachea the usual canula, which is very blunt, dilating forceps are used. At this step of the operation the incision is apt to be lost, or while introducing the forceps much blood enters, and may continue so to do until the filling of the air passages with fluid causes violent spasmodic movements of the trachea. During this state of embarrassment quite a length of time may elapse before the canula can be placed, and the blood may clot and close the passage, exacting another loss of time for its removal. It has even been necessary to take out the canula again, and withdraw the clot with forceps. Several instances have occurred where these delays eventuated in the death of the patient. The present canula is flattened to a narrow ellipse which requires much less dilatation of the opening to admit, and affords as much space for the air to pass as the oval tube. To the larger or ex-

ternal of these double canula is fitted a modification of the common trocar. A flattened conical blade, with concave cutting edges, is adapted to a hollow tube of silver, which fits the larger canula. This tube is perforated with four openings, (two for each side of the instrument,) two are pierced closely behind the trocar blade, and the other two just under the handle of the tube, and at the other extremity of the canula to be introduced. The object of these holes is two-fold, one to admonish the operator that he has pierced the mucous lining of the trachea by the exit of the air, the other to admit air at the earliest moment of the operation into the lungs and commence the relief from suffocation even before the operation is complete. The more gradual decline of the cerebral congestion it is hoped will prevent syncope, etc., and the exclusion of all blood from the trachea obviate the spasmodic struggles which accompany the first opening into that passage. What little hemorrhage may occur from the tracheal mucous membrane will be limited in amount by the close adaptation of the canula to the size of the wound. The end of the canula having passed the incision into the trachea, it only remains to perform the double movement of withdrawing the trocar and advancing the canula into the trachea. The second tube being then properly adjusted, the operation is concluded. The broad shield of the first canula is countersunk to prevent the fluids which may exude from the wound flowing over its edge into the tube.

This article cannot close without allusion to another of the great dangers of the operation. All the efforts and promise of relief may be suddenly disappointed by the closing of the tube. No surgeon who performs Tracheotomy should allow the tube to be disregarded for a single moment. Never should the watchful eye of professional care, or parental, close on the patient in this stage of the treatment. In a beautiful article on Tracheotomy, in the last number of the Medical Chirurgical Transactions of London, two cases at least were lost by a modification of this cause of trouble. In a case where Dr. Brown operated, the most hopeful result was promised, when an attendant fell asleep at his post, and woke to find the patient dead by the closing of the tube. It hence behooves the surgeon to insist with rigid imperativeness upon this care.

Did not the great importance of obtaining intelligence upon this question of Tracheotomy appear to warrant, the writer would gladly have been more concise.











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