

**The treatment of diseases of the throat and lungs by inhalations, with a new inhaling apparatus / by Emil Siegle ; trans. from the 2d German ed. by S. Nickles.**

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Carroll, R.W. & Co.  
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### **Publication/Creation**

Cincinnati : R.W. Carroll & Co., 1868.

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THE TREATMENT  
OF  
DISEASES OF THE THROAT AND LUNGS  
BY  
INHALATIONS.

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EMIL SIEGLE.

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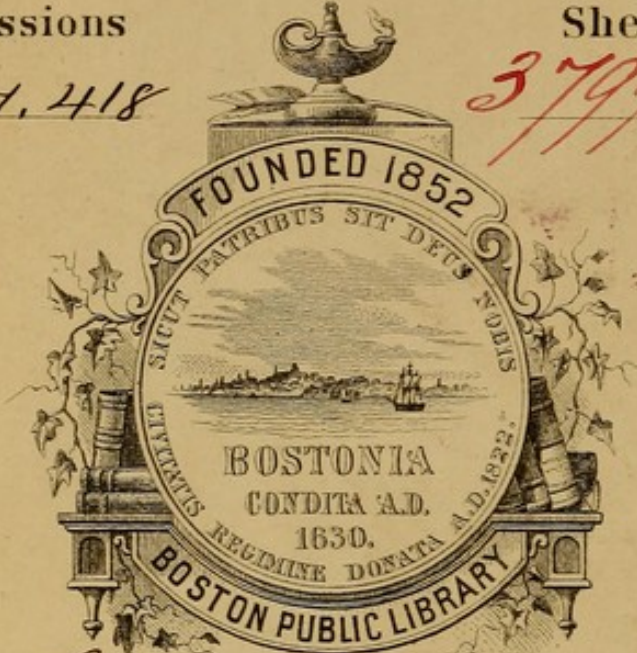
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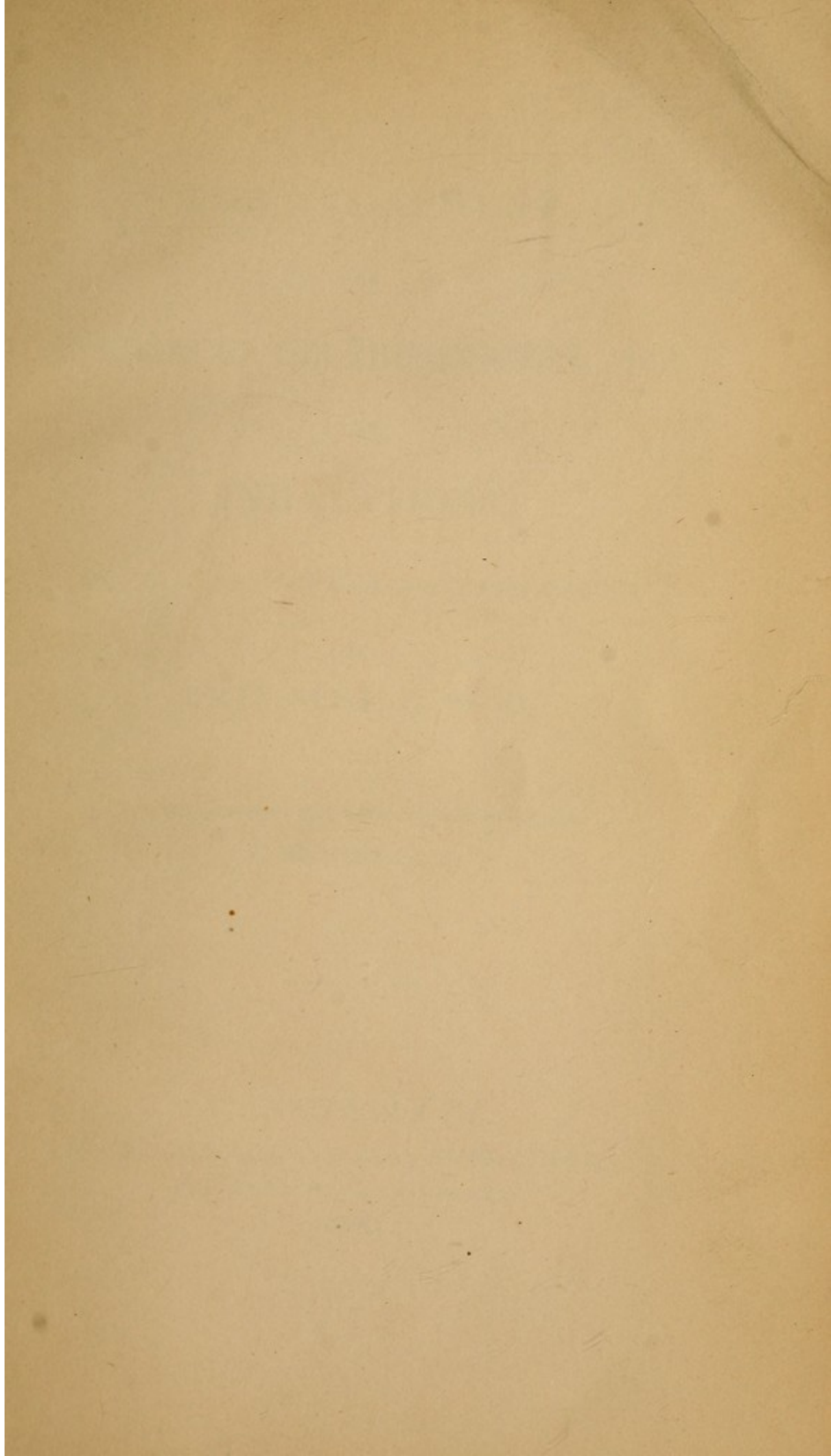


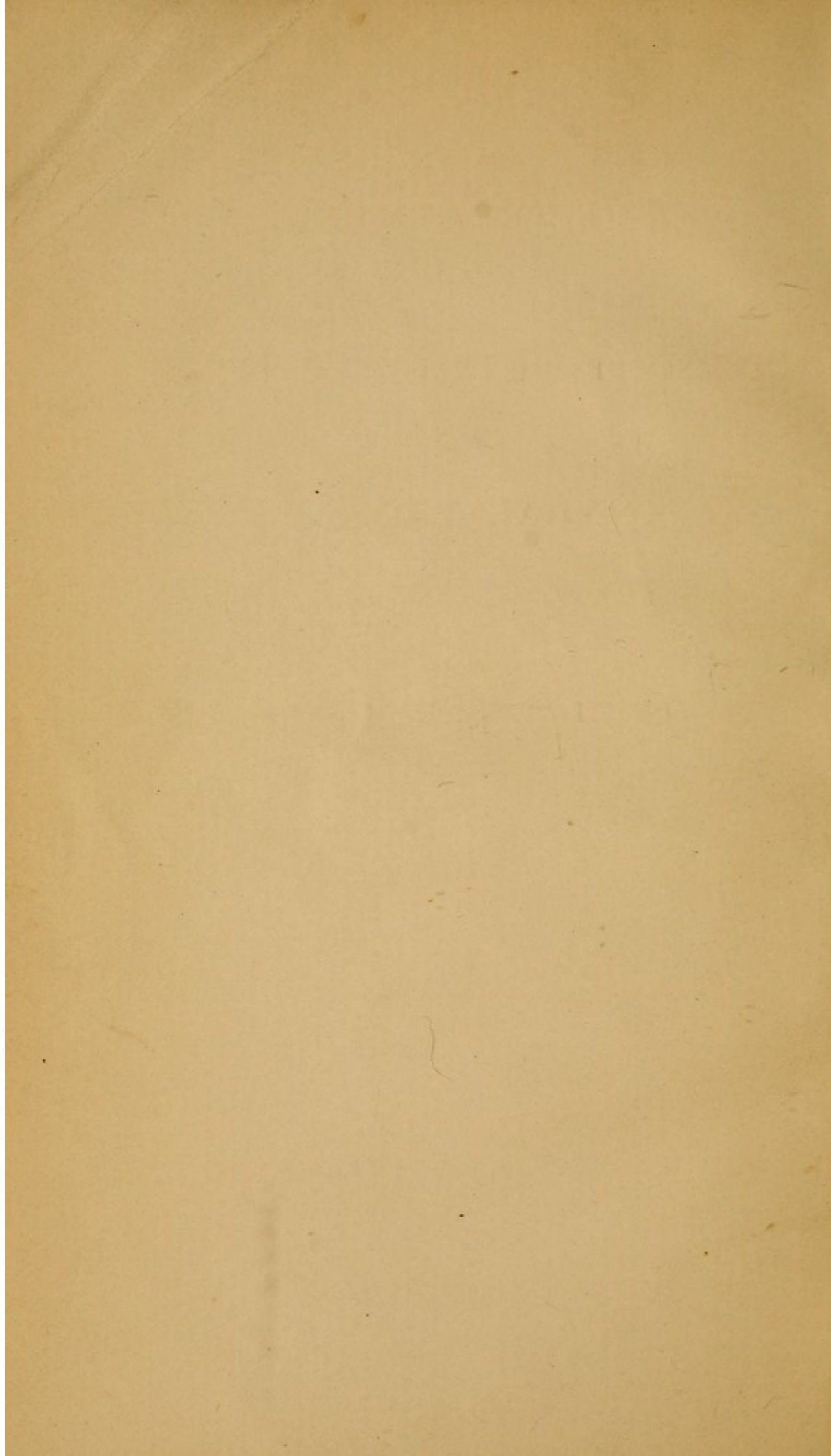
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THE TREATMENT  
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BY  
INHALATIONS,

*WITH A NEW INHALING APPARATUS.*

BY  
EMIL SIEGLE, M. D.

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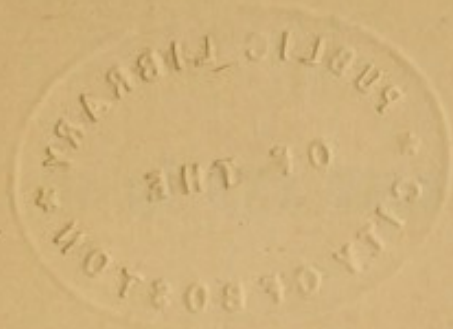
TRANSLATED FROM THE SECOND GERMAN EDITION BY

S. NICKLES, M. D.

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*CINCINNATI:*  
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117 WEST FOURTH-STREET.  
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## PREFACE

TO THE SECOND GERMAN EDITION.

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THE speedy exhaustion of the first edition of my little book, and the general reception that my steam-inhaling apparatus has met abroad, as well as at home, in the course of a few months; the favorable reviews of my book in several of our medical journals, and the wishes expressed by many of my professional friends, encourage me to prepare a second edition.

The materials so abundantly received since have given rise to new observations, and to the collection of much valuable experience. But my expectation of placing the latter as a whole before the profession, has been thwarted for the present by the very fullness of the materials.

I desire to state distinctly that I have derived great assistance from Waldenburg's Lehrbuch der respiratorischen Therapie, Berlin, 1864, and embrace this opportunity to express a very high opinion of the merits of that excellent work.

In this edition I have tried, as much as possible, to accede to the wishes of my professional brethren.

DR. SIEGLE.

## TRANSLATOR'S PREFACE.

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**A**LTHOUGH but nine years have elapsed since Sales-Girons went before the Paris Academy of Medicine with his "portable pulverizer of medicated fluids," yet in this short time the novel method of treatment has been adopted in all civilized countries, and everywhere hailed as a great accession to our most valuable therapeutical means. The success, however, of the new plan of treatment is undoubtedly in a high degree due to the perseverance of the author of the following pages, who, after many efforts, was enabled to present to the profession an improved inhaler, of which steam is the motive power, instead of the compressed air of Sales-Girons' apparatus.

It is not necessary to allude to the many advantages of Dr. Siegle's apparatus over the

inhalers previously presented to the profession, as the reader will find them sufficiently set forth by the author.

The following pages are based on the results of the practice of Dr. Siegle, and other physicians, who have perseveringly and extensively employed inhalations. The reader will observe in the author, it is true, an ardent advocate of the novel mode of treatment, but one not less truthful and candid in his statements. Universal success is not claimed. Still, everywhere the firm belief is apparent that inhalations will, at no very distant time, occupy the most prominent part in the treatment of the diseases to which they are applicable.

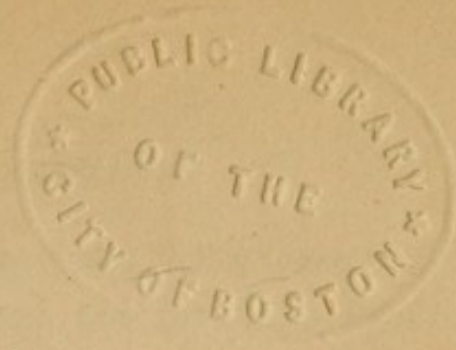
No. 36 FIFTEENTH-STREET, }  
*Cincinnati, December, 1867.* }

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## TREATMENT OF DISEASES BY INHALATIONS.

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### INTRODUCTION.

**G**IGANTIC advances in the province of the practice of medicine mark particularly the beginning of this century. It was attempted to liberate the mind from the obscure assumption that a number of diseases have their seat in the blood, and to perceive that most of them do not consist in the acrimony of the fluids, but rather in local derangements of the nutritive process, requiring local treatment. Several branches of surgery led the way with a bright example, particularly ophthalmology, which, bidding adieu to the host of gouty, rheumatic, and scrofulous diseases of the eye, subjected the derangements of the visual organ to local treatment, and celebrated an enviable triumph in this emancipation from old theories.

Soon followed aural surgery, with equally happy results. The fruits of the newly acquired views,



however, were most ample in the treatment of those diseases that had been more especially regarded as the emanation of the pernicious fluids of the body, and, therefore, had been combated with internal remedies. The diseases of the skin, that in most cases had opposed a profound contempt to the great guns of the materia medica, now disappear in the majority of cases easily and durably upon local treatment.

Now, in the last decennary, which brings us to our subject, the diagnosis and therapeutics of the diseases of the respiratory organs received a profound improvement by means of two most important inventions. The laryngoscope, introduced into practice by Czermak and Tuerk, threw its illuminating rays into the dark regions of the larynx and trachea, regions never before seen in the living, and offered to scientific curiosity not only a happy surprise, but new and most important improvements in the practice of medicine. But, unfortunately, laryngoscopy, notwithstanding its great returns, has as yet been but little regarded by the busy physician.

The other memorable invention, the employment of so-called pulverized fluids for inhalation into the respiratory passages, was now most timely, for with this new means it was possible to treat these parts with almost as much certainty as if they were

on the external surface of the body. This acquisition is immense and evident. Could we reach every diseased organ of our body with local remedies, our success would be vastly greater than in trying to effect our object in an indirect manner by introducing medicines into the stomach. In the latter mode of treatment, where the perception of the complicated operations is difficult and often even impossible for the most experienced, there is free scope for theories and hypotheses. However, this is just what is wanted for miraculous cures. Where obscurity abounds, there mesmerism, sympathy, homeopathy, and their gentle sisters who dwell in the benighted regions of human knowledge, may still find votaries, and open to indiscreet credulity the much-frequented shop.

The idea of curing the diseases of the respiratory organs by means which act directly on the affected parts is, however, not new, various methods of local medication having been adopted at different times according to the standard of scientific views. In the following enumeration chronological accuracy is not claimed:

1. The diseased larynx is touched with the medicine dissolved in a proper menstruum. Bell first introduced into the larynx, for this purpose, a curved stick, to which was attached a sponge saturated with the nitrate of silver. This method

is still often resorted to, particularly in croupous inflammation of the pharynx and larynx, and with undoubted success. Yet it must be objected to this procedure that only the inlet of the larynx is reached without any distinction as to healthy or diseased parts. For the sponge we may substitute a pencil, which, of late, is introduced covered, and, having been brought into the larynx by the aid of the laryngoscope, is then unmasked. I must mention, for the sake of completeness, that French and English physicians have thrown fluids into the air-passages by means of a syringe resembling Anel's, the results of which I do not know.

2. The second method, that of applying medicines in the solid form, has the advantage of greater accuracy. I frequently adopt it in the treatment of catarrhal ulcers and erosions, syphilitic excrescences, and soft new formations, but only with the aid of the laryngoscope, so as to be able to guide the hand accurately. I use for this purpose a caustic-holder, constructed by myself, that need not be described here, as it does not essentially differ from those found every-where.

3. The third method is that of applying medicines in the powdered form. This ancient procedure has been particularly eulogized by Trousseau and Belloc. It may be advantageously adopted, particularly with the aid of the laryngoscope, when

the larynx is too extensively affected for treatment with solid caustics. By means of Stork's instrument, which I can recommend highly, I have, in obstinate cases that had resisted the inhalations of pulverized fluids, applied to the affected parts by insufflation powdered alum, nitrate of silver, and red precipitate. A very simple contrivance, consisting of a goose-quill or a short glass tube, will enable the patient to employ medicines in this form.

4. The inhalation of medicines in the form of gas or vapor. As the methods already mentioned can extend their effects only to the larynx and trachea, and at farthest to the bronchi, and therefore have no bearing on the diseases of the lungs, the application of gases and vapors which can easily permeate the whole respiratory tract is a decided advance. Who is not aware of the success of the inhalations of turpentine introduced by Scoda? But, unfortunately, this excellent method is very limited in its applicability, as but few substances fit to be inhaled exist in the gaseous form, or can be transformed into it.

5. For this reason, the idea of adapting solid non-volatile medicines, after previous solution in water or dilute alcohol, to the purposes of inhalations by changing them into the form of a very minute spray, has created a general sensation.

## HISTORY OF INHALATIONS.

THE first idea of the new plan of inhalations, to which alone we will now direct our attention, seems to have been conceived in the beginning of this century by Schneider and Walz, not, of course, for the purposes of inhalations, but for that of spray baths. In the year 1845 Hirzel, of Zurich, first employed in the treatment of consumption inhalations of an artificial sea-atmosphere, which was produced by passing artificial sea-water through a fountain. Auphan, of Euzet les Bains, in 1849, set apart a room in which the mineral water of that place was atomized for the purposes of inhalations. A similar institution soon appeared at Lamothe les Bains. But, without doubt, the honor of the invention, as well as the merit of having given it practical significance by his zeal and diligence, belongs to Sales-Girons, who, with Dr. Flubé, erected a building for the purposes of inhalations at Pierre-fonds in 1856, and who went before the academy with a portable apparatus in 1858. Sales-Girons gave to the new method the perhaps inappropriate name of *Pulverization of Fluids*; and his apparatus, skillfully made by

Charrière, was called *Pulverisateur portatif des liquides medicamenteux*.

Although but four years have elapsed since the appearance of the first paper of the French physician, yet in this short time the new plan has every-where received much attention, and the local treatment of the diseases of the respiratory tract has, in consequence, been much more ardently pursued than even the meritorious author could have anticipated.

It was principally the mechanical part of the novel therapeutical measure under consideration which engaged the attention of physicians; and, indeed, their efforts, as we shall soon see, gradually produced a number of improved inhalers.

1. In the apparatus of Sales-Girons, manufactured by Charrière, the medicated fluid is forced by the pressure of an air-pump through the capillary opening against a metallic disk, and thus broken up into a fine spray, which, of course, contains the pulverized medicine. This spray is inhaled by the patient.

2. The "Nephogène" of Matthieu, of Paris, is very complicated. Its action depends on the peculiarity that compressed air is forcibly driven, with the medicated fluid, through a capillary opening, whereby an extensive spray is produced.

3. Fournier's apparatus represents that of Sales-

Girons, except that the disk against which the fluid bounds to form the spray is held in the patient's mouth.

4. Lewin, of Berlin, is the inventor of several inhalers, which, on account of their excellence, have been extensively used; they also are constructed on the principle adopted by Sales-Girons, were formerly made of zinc, but now of glass.

5. From the inhalers mentioned that of Waldenburg, of Berlin, is distinguished by its simplicity and comparative cheapness, with equal efficiency. Constructed on the principle of the high-pressure pump of C. Mayer, it also produces the spray by causing the fluid to strike against an obstacle; the forcing power, however, is not air, but compressed water. (For the benefit of those in possession of this apparatus we will remark that its efficiency may be increased by pulling a horse's hair or a pig's bristle partly through the capillary opening of the tube, so as to leave one end hanging out. Not only does the spray become much finer, but the annoying obstructions which occur so frequently may be overcome by slightly pulling the loose end of the hair.)

6. The apparatus of Schnitzler, of Vienna, which represents a hand syringe, is founded on the same principle. The piston, which is impelled by a screw, presses the contents of the syringe very

forcibly against the resisting disk placed before the capillary opening. The patient holds the upper part in his mouth while inhaling.

7. Dr. Bergson, of Berlin, has increased the number of inhalers by a new one constructed on an idea originated by Dr. Natanson. The idea is really ingenious, and therefore Dr. Bergson's apparatus, which he calls *hydrokonion*, deserves a detailed description. It consists of a glass vial containing the medicated fluid, into which dips a glass tube terminating above in a capillary opening; another tube, also drawn to a very fine opening, extends horizontally to this one, so as to form a right angle with it, at which the capillary openings meet. To the remote end of the horizontal tube is attached a bellows and wind-furnace made of gutta percha. The air, which is forced through the horizontal tube, passes over the vertical one, thereby rarefying the air in it. The medicated fluid ascends, and, passing through the capillary opening is anatomized and projected to a considerable distance. By blowing air into the horizontal tube with the mouth the process is much simplified.

The literature of this subject already presents a large amount of experience, and, although fixed principles have not as yet been established, still by gradual elimination some conclusions have been



attained which may well claim a degree of certainty. But I have no doubt whatever that the great practical value of the new therapeutical measure will not be fully recognized till it is generally adopted by practitioners.

For its not having been so extensively adopted by practitioners, as might have been expected, two reasons may be assigned: first, the want of a reliable guide in the use of inhalations, as the results of treatment published in the journals still remain uncollected; and, secondly, the indisputable defectiveness of most of the inhalers heretofore offered to the profession.

I examined nearly all the inhalers briefly described above during my visits at Vienna and Paris. Convinced that the novel therapeutical measure will in future take a prominent part in the treatment of the diseases of the respiratory organs, I procured the atomizers of Sales-Girons, Matthieu Waldenburg, and Bergson, and subsequently used them in the treatment of a large number of patients. Knowing their defects as well as advantages from personal experience, and therefore reflecting on improvements, I had the extreme satisfaction of seeing my efforts rewarded with success.

I have lately succeeded in establishing the atomization on a new principle, and in constructing an inhaler which, in regard to security and

simplicity, ease of management and cheapness, is adequate to all just demands, and which, therefore, as I anticipated in the first edition, has been extensively used at home and abroad.

In contrast with all other atomizers my motor power is neither compressed air nor compressed fluid, but steam, which has already heretofore played a prominent part in social life. I asked myself, Can not steam be substituted for compressed air, as it also will rarefy the air in the perpendicular tube, as in Dr. Bergson's apparatus? The first experiments afforded no satisfactory answer, but longer perseverance gave a happy solution to the problem.

A coffee-machine with a brass boiler constituted my first apparatus, and as it proved successful, the inhalers first manufactured for sale by F. Mohlenkopf, in 1864, were constructed with brass boilers. They had no safety-valve, as the walls of the boiler were strong enough to resist the pressure of the small amount of steam, which would have driven the cork off the mouth before it could have exploded the boiler. Metallic boilers, however, have this defect, that the amount of water they contain can not be so readily ascertained by the eye as with glass boilers. And if it is once neglected to supply the boiler with water, it becomes glowing, and rapidly melts.

For this reason, I have lately had some inhalers manufactured with glass globes, which have a thermo-barometer attached, both as a means of security and to indicate the amount of pressure.

These glass receivers are so constructed that they will bear the pressure of two atmospheres, while the apparatus, to my great satisfaction, worked well under one-half atmosphere. I do not, however, make use of a manometer for ascertaining the amount of pressure, but prefer the thermo-barometer of Collardeau, which is more reliable and less brittle.

At first, I thought of using a safety-valve; but the experiments made by Zimmerman, the mechanic, and myself with the various kinds of safety-valves resulted in the rejection of all, as the smallness of the dimensions present peculiar obstacles to all such contrivances. No reliance could be placed on them, as they sometimes opened on different degrees of pressure, and sometimes entirely refused. Consequently, it became our object to discover a contrivance which would exhibit the varying amount of pressure of the steam with accuracy; this was found in the thermo-barometer. Not dependent on chance nor subject to disturbances, it indicates at all times the degree of pressure of the steam, so that the flame can be regulated accordingly; thus explosions may be prevented.

Besides this, it indicates the degree of strength of the spray and the rapidity of its current. The boiler may be more or less intensely heated; the amount of steam developed, and the degree of its force will vary accordingly. The physician must make these variations subservient to the objects of treatment, and adapt them to the individuality of his patients; like the electrician, he ought to be able at all times to regulate the strength of his agent. A patient who yesterday inhaled under the pressure of one-half atmosphere, ought not to-day be placed under the double or triple amount of pressure. Even should hereafter an unobjectionable safety-valve be found, the thermo-barometer would still be necessary. For this reason, my inhalers with metallic boilers are also furnished with a thermo-barometer.

I consider those atomizers dangerous to health, in which an open manometer filled with mercury serves the purpose of a safety-valve, such as those offered for sale here, as an improvement, by the optician Hetchel. The mercury can easily pass from the U-shaped tube into the water-reservoir, and, becoming vaporized there, will endanger the health of the patient.

The apparatus manufactured by Mattich, of Berlin, is also hazardous. As long as the tube does not become obstructed, or if the obstruction is soon

observed and removed, there is no danger. If, however, mineral or metallic substances close the tube, a powerful explosion of the boiler must take place, as, the mouth being closed by a screw, the steam can find no outlet; whilst any danger of the explosion of my metallic boiler is prevented by the thermo-barometer, and if its warning should not be heeded, by the cork on the side opening.

According to my experience, this cork, even when requiring some force for its introduction, is preferable, for our purposes, to all other safety-valves.

The spirit-lamp used for heating is supplied with a screw. By turning this, the flame may be enlarged or diminished, and the tension of the steam be accurately regulated by the scale of the thermo-barometer. Thus explosions can be prevented. During the last year I have worked ten inhalers, and have met no accident. Moreover, the boiler is covered with a tin shield, which would prevent injury from explosion, as an experiment made for this purpose has satisfied me. Every globe is tested under a pressure of two atmospheres, and the apparatus is not offered for sale by the manufacturer until he has fully satisfied himself by experiment of its complete usefulness. Besides this, printed directions as to the mode of working the apparatus are given to the purchaser, in order to prevent any misunderstanding.

I have lately become convinced that there are persons who neglect even the small amount of care required in working my apparatus. For instance, some patients poured the medicine into the boiler instead of the medicine-cup; others neglected to stop the working of the apparatus, after having completed the inhalation.

I can not refrain from again calling attention to the advantages which characterize the new steam inhaler.

1. As the utility of the novel therapeutical means depends principally on the question of the penetration or non-penetration of the atomized fluid into the respiratory passages, we must accord preference to that principle by which the finest spray is produced, for the finer it is the more readily can it pass into the respiratory organs. This principle is no other than that of steam. Many comparative experiments have convinced me that my apparatus is not equaled by any other in this respect. In order to avoid self-deception, I used a contrivance resembling the respiratory organs. After passing the spray through this tube, which was curved in various directions, I could still detect the presence of iron in the spray, by means of tannic acid, at a distance of five feet.

Moreover, a single trial with my apparatus will suffice to convince any one of the extraordinary

fineness and yet great compactness of the spray, which rises in the air like a light cloud of smoke.

These favorable conditions are owing to the specifically light steam, which, floating in the air, facilitates the atomization of the medicated fluid, and admits of its greater diffusion. Steam is the best carrier of the atomized fluid-molecules.

I have considered the fineness of the atomized fluid at some length, because my apparatus, which does not require the exertion of pumping on the part of the patient, has been commended for operating by its own impulsive force. This advantage is of little moment, however, compared with the other. In the use of steam as the means of atomization is to be found the essence of my invention. Whether the boiler consists of metal or glass is of no importance.

Waldenburg has thoroughly understood the importance of steam. He says, in his lately published work: "Whilst the greater part of the fluid of the simple spray (the spray obtained by other means than steam) is lost in the pharynx and first part of the air passages, a very large quantity of the atomized fluid, when the 'steam-spray' is used, is enveloped by the steam, and carried into the remotest bronchial tubes."

I demonstrate the surpassing fineness of the spray to physicians who visit me, by a simple experiment.

Instead of a medicated fluid, I put a solution of indigo in the medicine-cup. As soon as the apparatus is in action, and the atomization has begun, I hold a piece of white paper in the current, at a distance of from one to two feet from the tube. After a few seconds the paper exhibits a light-blue tint, which soon becomes deeper, but remains remarkably fine and delicate, without having any large drops of fluid interspersed. This, however, is true only of the best inhalers, in which the capillary openings of the tubes are very fine, and their position in regard to each other accurately correct. The slightest variations, which are not even visible to the naked eye, give rise to very considerable modifications in the fineness of the spray. Many of the manufacturers of my apparatus do not pay sufficient attention to this fine atomization, which is the *conditio sine qua non* for the entrance of the spray into the deeper parts of the respiratory tract.

2. By all authors who have written on the subject of inhalations, the fact that the spray has a low temperature when it enters the air-passages, is lamented as an inconvenience of all the inhalers thus far constructed; some of them even demand that this shall not be, without stating, however, how it can be avoided. If I mistake not, it was Tampier who proposed to convey the current into a



space warmed by steam. I have not tried this, but am satisfied that it is too circumstantial to be practicable. Still I am convinced, from experiments on myself, as well as on patients, that the low temperature of the inhaled fluid is the principal cause of the annoying and often serious phenomena of irritation of the larynx. I can not, therefore, agree with Fieber and Wedemann, the latter of whom is even inclined to attribute an agreeable and curative effect on the respiratory organs to the coolness of the spray; but, on the contrary, believe that the low temperature has placed an unpleasant restriction on the application of the new therapeutical measure. For I was compelled to stop the employment of inhalations with many of my patients, when I was still using the inhalers first invented, because the paroxysms of cough constantly excited, disturbed the process, and made it painful. The same patients, however, could resume and successfully continue the inhalations as soon as I made use of my apparatus with its warm temperature; for one of the principal advantages of the latter consists in the fact that the temperature of the spray varies from 59° to 68° Fahrenheit, according to the distance of the patient from the apparatus; whilst the temperature of the spray of Bergson's inhaler sinks down to 48°, and that of Waldenburg's to 46° Fahrenheit, a temperature which

makes the impression of extreme cold on the respiratory organs.

Besides, the temperature of the spray of my apparatus may be elevated considerably by seating the patient nearer the inhaler, and placing a small spirit-lamp between him and the outlet of the tube. The medicated fluid also may be warmed by putting a small lamp under the cup containing it. I have had occasion to make use of these measures in only a few exceptional cases, as the ordinary temperature of the spray generally sufficed. In hæmoptysis, of which I have since treated several cases with my apparatus, it would seem, at first, desirable that the spray should come in contact with the bleeding spot at the lowest possible temperature. But it must be duly considered, whether the danger of excessive irritation of the larynx would not more than counterbalance the supposed advantage, aside from the fact that when the bleeding takes place from the lower parts of the air-passages, the spray will become warm by contact with the upper parts, which may suffer therefrom, and will consequently not reach its destination with the intended cold.

3. Whilst obstructions are frequent with the apparatus of Waldenburg and all others that force the medicated fluid through a capillary opening, the practitioner and patient will be highly pleased

to know that these vexatious disturbances can not take place at all with my inhaler, as steam does not carry solid particles; on the contrary, steam has a tendency to cleanse the parts with which it comes in contact. The capillary opening of the vertical tube which extends into the medicine cup may possibly become obstructed, if the medicated fluid is not well strained, which, therefore, should be carefully performed; but under no circumstances should the attempt be made to remove the foreign body, as has been done several times, by the introduction of the point of a needle into the capillary opening, for, should the smallest particle break off, the tube would become wholly useless. Generally, the foreign substance may easily be removed by pushing a bristle, or a horse's hair, from below through the tube. Particles on the capillary openings may be rapidly and safely removed by drawing a camel's hair pencil several times over the angle formed by the mouths of the tubes.

I will here remind the practitioner that if different medicines which may produce mutual decomposition are put into the medicine cup in succession, the apparatus should always be previously cleansed by filling the medicine cup with distilled water, and continuing the action for a few minutes longer. For instance, after having employed a solution of tannin, we should not pass to chloride of

iron without having previously cleansed the apparatus, as the tannate of iron would be formed, which would obstruct the tube. For the same reason, I put all tubes which I have used into a mixture of dilute nitric and sulphuric acid at night.

4. The action of the atomizers heretofore made gradually declines during the inhalation, and the patient or his assistant must again work the pump in order to restore it. This gives rise to two inconveniences: first, the force of the spray is disproportionately greater immediately after the pumping than near the close of the inhalation, when the tension diminishes again; it therefore lacks uniformity; secondly, the physical exertion required in working some inhalers is so great as to be annoying to all patients, and dangerous for the weakly and those liable to pulmonary hemorrhage.

Nothing of this kind occurs with my apparatus. Having been put into operation by simply lighting the spirit-lamp, and brought up to the tension marked on the scale of the thermo-barometer by means of the lamp-screw, it goes on to the end of the inhalation with perfect uniformity of action. The omission of the thermo-barometer is, therefore, a deplorable deterioration.

As the sittings are not to be continued over fifteen minutes, neither the boiler nor the medicine cup will require refilling. Whilst inhaling, the

patient need only occasionally observe the thermo-barometer, for the tension of the spray once regulated remains nearly uniform during the sitting. If it is about to rise above the prescribed line of the scale, the flame must be turned down a little or the lamp removed for a few moments, for which there will be plenty of time, as the apparatus operates under a pressure of one-half atmosphere, but had been subjected to the fourfold pressure when originally tested. Moreover, as the apparatus is supplied with a shield, nothing would be lost in case of explosion, except the glass boiler, the patient himself being in no danger.

5. My apparatus consists, in its most essential parts, of glass, and will, therefore, admit the use of all even the most decomposable metallic combinations, as chloride of iron and nitrate of silver, an advantage which it shares alike with the inhalers of Lewin and Bergson. For this reason, also, it may be easily cleansed, and, without loss of time, used in succession for the most diverse remedies. Its greater friability is a disadvantage that belongs to all other glass vessels used for scientific purposes, which is, however, sufficiently counterbalanced by greater advantages. Moreover, reserve tubes are added for the unskillful and inexperienced, for whose use the kind with the metallic boiler should be recommended. To avoid deposits

in the boiler, distilled water is preferable to common water.

6. Finally, I desire to call attention to the low price at which my apparatus can be sold, on account of its simplicity, which precludes likewise the frequent repairs required by all other inhalers; in this respect, too, it is better adapted for general use.

But to return to the history of inhalations. Nothing was more natural than that opponents to the novel therapeutical process should appear soon after its origin. As long as they base their opposition on reasons which deserve respect, like Pietra-Santa and Fournier, we should, in the interest of truth and science, meet them in a friendly manner. But what shall we say, when from sheer aversion to the new method, with which many, from want of time or inclination, will not make themselves acquainted, they assume a haughty contempt, and, without perhaps knowing more about it than its name, oppose it with empty negations; as, the atomized fluid can not penetrate into the air-passages, etc.?

For this reason, and to gratify many who may feel interested in the method, and the exact experiments by which the entrance of the atomized fluid into the respiratory passages was placed beyond a

doubt, I will narrate them briefly, availing myself of Lewin's and Waldenburg's description. I almost feel tempted to say that the instructive and ingenious experiments which secured the permanency of the new therapeutical means, were not even necessary, if we consider the successful results by which inhalations have since been attended.

Before Lewin proceeded to answer the question under consideration, he supposed it necessary to elucidate a controverted point unsolved from time immemorial; namely, whether the workers in stone, and others occupied in spaces in which small particles are suspended in the air, really inhale these particles. The author, having critically examined the opinions held on this point by ancient and modern authorities, proceeded with his own experiments, which are the more valuable to science, as the microscope and chemistry were both called into requisition. The sputum of colliers, stokers, molders, and workers in porcelain and wadding, was subjected to chemical and microscopical examination; the lungs of deceased workmen were carefully investigated, and finally the conclusion established that these persons do not only really inhale the minute particles suspended in the air, but that the latter, passing on to the air-cells, are able to penetrate into the lung-tissue, in consequence of their tapering form. This conclusion was rendered

still more certain by Lewin's experiments on rabbits, which were placed in an atmosphere filled with coal-dust, and then killed. He was able to demonstrate the presence of particles of coal in the larynx, bronchial tubes, air-cells, and lung-tissue.

The analogy of these facts, justifying certain expectations in regard to penetration, we come to the latter question: may fluids also, which have been broken up into a fine spray by means of atomizers, enter the bronchial tubes?

The most dissimilar methods were adopted to decide this question, upon whose answer the fate of inhalations depended, and which was therefore of sufficient importance to occupy the attention of the most intelligent heads of France, both within and without the academy.

Negative results were obtained by:

Pietra-Santa. Observations on patients at Eaux-Bonnes resulted in conclusions unfavorable to the question of penetration; moreover, a goat and several rabbits were subjected to inhalations of different medicated fluids from Sales-Giron's apparatus; not a trace of the atomized substances could be found in the lungs or larynx.

Briau, on the whole, entertains the same opinion as Pietra-Santa. He relates, however, a case of bronchorrhœa, which was cured by inhalations of the chloride of iron, and admits that the new meas-



ure may be useful in the affections of the mouth and throat. Experiments made on rabbits were favorable to penetration, others made on dogs were unfavorable.

Bouley and Briau experimented on a horse, with negative results.

Fournier, the most violent opponent, resorted to a glass-inhaler, and subsequently to the pharynx and larynx of a corpse. These, as well as subsequent experiments, performed on himself and others, disposed him to the decision that atomized fluids do not enter the bronchi, while solid particles of dust may pass into them.

Champouillou, Delore, and Armand-Rey (the latter, however, used an unsuitable apparatus) were avowed opponents of the new species of inhalations.

The views of Durand-Fardel occupy a sort of middle ground between the opposing parties; he admits, indeed, the entrance of the atomized medicinal fluid into the larynx and trachea, but doubts its entrance into the bronchial tubes, and its future therapeutical utility in diseases of the latter.

The experiments quoted above, aside from the fact that they are counterbalanced by an incomparably greater number of observations with positive results, are not all above criticism. For instance, to call attention to but one point, in the experiments on animals, we miss a proper position of the head;

it was also neglected to keep open the mouth and close the nose.

Positive results were obtained by :

Demarquay, who experimented on a large number of rabbits and dogs, was generally able to prove the presence of the inhaled medicated substances throughout the whole respiratory tract. The experiments instituted on himself and others were also favorable to entrance. His last experiment, however, which was performed on the nurse of the hospital Beaujon, possesses a high degree of celebrity. This woman, who breathed through a canula, in consequence of a previous tracheotomy, inhaled a solution of tannin. The inhalation being completed, a paper, wet with a solution of chloride of iron, was pushed through the canula into the trachea; when removed it presented a well-marked reaction of tannin.

Auphan sides with the friends of the new measure, principally on account of therapeutical success.

Moura-Bourouillou inhaled a black fluid, and by the laryngoscope discovered the coloring matter on the mucous membrane of the air-tubes.

Tavernier and Gratiolet obtained similar results. They inhaled first a solution of chloride of iron, and immediately afterward a solution of ferro-cyanide of potassium.

Bataille employed inhalations of extract of rhatany for his bronchial catarrh. On the following day, he still expectorated reddish sputa, which seemed to come from the bronchi.

Sales-Girons constructed a respiratory apparatus out of gutta-percha. The glass tube, representing the trachea, presented drops of the nebulized fluid soon after the inhaler began to act.

Trousseau, surprised at the possibility of controversy, is of opinion that the spray enters but too abundantly, and that its application requires much caution.

In Germany a practitioner, Dr. Fieber, of Vienna, first paid attention to the new therapeutical measure, and labored very zealously for its general introduction. Fieber did not only repeat the experiments of Demarquay on animals, but also the experiment of the French scholar on a patient, breathing through a canula. Notwithstanding the great difficulties encountered in the experiment, a positive result was attained.

Schnitzler and Stork, of Vienna, also had the privilege of successfully experimenting on a patient, on whom tracheotomy had been performed.

According to Wedemann's report, Dr. Gerhardt had an opportunity of convincing himself of the entrance of the medicated fluid by means of laryngoscopic examinations, as also by a repetition of

Demarquay's experiment on a patient with a tracheal fistula.

It can not be denied that in the observations adduced, it has not been established that the medicated spray penetrates into the lungs of man. But the two following observations also prove this, and it may therefore be of interest to relate them briefly :

Professor Zdekauer of Petersburg, employed inhalations of chloride of iron in a patient who was nearly moribund from hæmoptysis. In the post-mortem Dr. Holm turned out coagula of very firm consistence, and detected a much larger quantity of iron every-where in the pulmonary tissue than is usually found in the blood.

The next case is that of a coachman, aged forty-eight years, who had tuberculosis, at Frerich's clinic. On the occasion of a severe attack of hæmoptysis, an atomized solution of chloride of iron was employed. The sputa diminished, and contained less blood, the dyspnœa decreased; but, notwithstanding, the patient succumbed to his disease on the following day.

The post-mortem confirmed the diagnosis. Dr. Schulz demonstrated the presence of small quantities of iron in the uncombined state in the dark fluid and black coagula which were contained in the cavities.

Who would longer hesitate to adopt the decision of Poggiale, to whom the question under consideration was referred by the commission of the academy? He says that there can be no doubt of the penetration of atomized fluids, according to the scientific experiments performed on human beings and animals to ascertain this point.



#### THE MODE OF ADMINISTERING INHALATIONS.

**I**N the following I will describe the mode of administering inhalations adopted in the treatment of the patients who inhale at my rooms.

The patient is seated on a convenient chair in front of the apparatus. The tube conveying the steam is at the level of the mouth of the patient, who rests his crossed arms or elbows on the narrower side of a table, which, like a music-desk, can be elevated to any convenient height. Having put my apparatus in action, which takes from three to five minutes, (during which time the patient is informed as to the arrangement of the inhaler and the use of the thermo-barometer,) I request him to recline his head slightly, to open his mouth as far as possible, and to breathe slowly, regularly, and

deeply, while I direct the current of spray into his mouth.

I can see no advantage in the adoption of Dr. Waldenburg's suggestion to let the patient inhale in the standing position.

As the nebulized fluid is better borne, according to my experience, when of high temperature, I direct the patient to inhale at the beginning of each sitting, at a distance of from four to six inches from the capillary opening, and gradually at the distance of from one to two feet. According to the impressibility of the patient, I do not continue the first sitting longer than from three to five minutes, and administer but one daily. By degrees the sittings are lengthened to five, ten, even fifteen minutes, and four, six, eight, ten, given daily.

I also try to adapt the strength and temperature of the current of atomized fluid to the different pathological and individual conditions. The temperature of the spray diminishes with the distance of the patient from the apparatus. So, too, the force of the current, but not in the same proportion, for this depends on the tension of the steam, and can, therefore, be regulated by the lamp-screw and thermo-barometer. Without a due regard to these circumstances, exact scientific observations are impossible.

The following example will serve to illustrate this matter :

- |                                     |                     |
|-------------------------------------|---------------------|
| 1. Current strong.                  | Temperature high.   |
| Thermo-barometer 2°.                | Distance, 2-6 inch. |
| (In croupous laryngitis.)           |                     |
| 2. Current strong.                  | Temperature low.    |
| Thermo-barometer 2°.                | Distance, 1-2 ft.   |
| (In chronic pharyngitis.)           |                     |
| 3. Current weak.                    | Temperature high.   |
| Thermo-barometer 1°.                | Distance, 2-6 inch. |
| (Tuberculosis of larynx and lungs.) |                     |
| 4. Current weak.                    | Temperature low.    |
| Thermo-barometer 1°.                | Distance, 1-2 ft.   |
| (Hæmoptysis.)                       |                     |

Precise rules can not be laid down; every physician will in a short time, by tact and experience, adopt the proper course. The patient soon acquires a certain degree of skill in inhaling, and particularly in suppressing the impulse to cough, which at first is very strong. I would, therefore, suggest that, at the commencement of the inhalation, unskillful and timid patients should be placed under the influence of simple water only, to which the medicated fluid may be gradually added. It may be advisable, for the same reason, to moderate the tension of the steam at the beginning of the sitting, and gradually to increase it to a higher degree of the thermo-barometer by enlarging the flame.

A similar course may become necessary with

sensitive and nervous persons. The patient may also sit a little to one side at first, so as to leave the current pass beside his face; from time to time he can bend forward, bring his mouth into the current and breathe deeply.

In the case of little children and bed-ridden individuals, the apparatus may easily be placed in such a position that the spray can enter the mouth of the patient, who lies on his side with his face turned toward the inhaler. Of course, the bed and pillow will have to be protected by some water-proof substance.

Older children may be seated on the knee, and to remove their timidity we may perform the act of inhalation for their imitation. In this way children not more than three years old learned to inhale right well from childish curiosity and amusement.

Moura-Bourouillou proposed to close the nose of the patient in order to convey the spray into the respiratory organs. Another physician (Traube) suggested that the patient should extrude his tongue. I consider both unnecessary; but if the patient has a very large tongue and small mouth, I tell him to depress the tongue by means of the spatula.

The physician should never neglect to superintend the inhalations of the patient, whose zeal



otherwise will subside in a few minutes; he will hold the tongue negligently, and permit it to press against the roof of the mouth instead of keeping it flat on the floor of the buccal cavity, with its tip against the lower incisors; the position of the head will become faulty; the mouth will not be well opened; the inspirations will be performed without energy and too frequently; in short, both physician and patient will be robbed of their time.

I think it proper to suggest that the patient should inhale, at first, as if he were yawning, or as if he were silently articulating the vowel sound heard in *that*.

Having finished the inhalation, the patient should cleanse his mouth and throat by gargling with pure water; if, however, the inhalations are employed to cure affections of the mouth and throat, this should be omitted, that the medicine may exert its local effect as long as possible.

I can not too strongly impress physicians, as well as patients, with the necessity of observing the following rules:

1. The force of the current and the temperature of the spray should remain the same during the whole of the sitting. This can be done by keeping the patient at the same distance from the apparatus, and regulating the pressure of the steam by means of the thermo-barometer.

2. Inhalations should never be administered after physical or mental exertion as long as the temperature of the skin is elevated, and the pulse and respiration increased.

3. An interval of several hours should intervene between a full meal and a sitting.

4. In diseases of the pharynx, the patient need not breathe deeply; and in those of the larynx, trachea, bronchi, and lungs, the depth of the inspirations should correspond to the distance of the diseased organ from the mouth of the patient, the deepest being required in affections of the lungs.

5. The patient should rest occasionally, and the length of the sitting should under no circumstances be continued beyond the strength of the patient.

6. The fluid accumulating in the mouth should be spit into a vessel by the side of the patient, unless the substance used be very indifferent; as, common salt, water, etc.

7. Children and minors should not be permitted to employ inhalations without superintendence.

8. Having completed the inhalation, the patient, who then generally coughs more, should rest a quarter of an hour before going out of doors.

9. During the inhalation the patient should not speak, nor should others converse with him. His whole attention should be directed to the inhalations.

### THE MEDICINES EMPLOYED FOR INHALATIONS.

AS already stated, all medicines soluble in water, or dilute alcohol, may be used for inhalations; these constitute the greater part of our remedies. It would be unscientific to employ medicines for inhalations which would suffer chemical change from atomization.

On account of the absorptive power and vulnerability of the respiratory mucous membrane, medicines possessing acrid or poisonous properties should be used with great care. In the use of inhalations as with all other therapeutic measures, the rule to proceed from the mild to the active demands peremptory consideration. As fully meeting this demand, I would recommend the process which I have adopted to physicians who every day administer inhalations at their rooms. I keep on hand, in special bottles, large quantities of concentrated well-filtered solutions of those medicines most frequently employed for inhalations. When a patient is to inhale for the first time, I take a certain quantity of a concentrated solution by means of a graduated pipette, and blow it into the medicine cup, which is then filled with distilled water. If

this is well borne, I increase the amount of the concentrated solution if necessary, and am thus enabled to adapt the strength of the medicine to the condition of the patient. The amount of the medicine used is easily calculated.

All medicines employed should be chemically pure, and their solutions well filtered before use; this is a little troublesome, but one is well compensated by the uninterrupted operation of the apparatus.

Adhesive substances, emulsions, and mucilaginous decoctions should never be employed, as they would obstruct the capillary opening.

Accurate statements in regard to the size of the doses used for inhalations can not be made, as the amount of the medicine passing with the spray into the air passages is subject to considerable variations, depending on the distance of the patient from the apparatus, the capacity of the inhaler, the depth of the inspirations, and the skill of the patient. Some special rules on doses will, however, be found with the treatment of particular diseases, and in the summary at the close of this volume.

The following medicines have generally been preferred by authors :

Water, alum, tannin, chloride of iron, nitrate of silver, iodide of potassium, tincture of iodine, corrosive sublimate, bromide of potassium, chloride of

sodium, muriate of ammonia, carbonate of potassa, tar water, creosote, some narcotics, and natural and artificial mineral waters.

Although, as we see, the number of medicines used for inhalations is by no means inconsiderable, yet an extensive field remains open for the experiments of the industrious observer.

To preserve my experience from the dangers of excessive division, I have heretofore confined myself to a few remedies which will be fully considered in the following pages; for I fully agree with Waldenburg that the number of medicines already employed for inhalations is rather too large than too small. He says: "If the new therapeutical measure is to meet with that success which may justly be expected from it, observers will at first have to confine their researches to few medicines; but these few ought to be thoroughly investigated as to their doses, and their physiological and therapeutical effects. Simples alone should be used for inhalations. Corrigenents and adjuvants ought to be banished, at least for the present, until the effects of each single remedy in different cases have been fully recognized."

#### MODUS OPERANDI OF INHALATIONS.

Though there can be no doubt that the effects of medicated inhalations depend principally if not

exclusively on the local action of the inhaled medicines on the affected parts, yet it must not be forgotten that other influences may be exerted at the same time.

1. If we consider the extensive area of the mucous membrane of the respiratory organs, and its acknowledged power of absorption, it is not improbable that many of the medicines intended for local action may be carried into the fluids of the body, and exert a general effect. Adopting this view, some physicians have suggested that in the administration of medicines the mucous membrane of the stomach should be altogether avoided, medicines for their general effects being administered alone by inhalations, a suggestion which has very properly met with strong opposition.

This consideration, however, impresses us with the necessity of being very careful in the choice of those remedies whose general influence on the organism is not desirable; but, on the other hand, we should prefer remedies which combine a general with a local action when a constitutional influence is demanded. It seems therefore quite rational to prefer the chloride of iron to tannin and alum when astringent or styptic inhalations are necessary in the treatment of anæmic patients.

2. The moisture of the inhaled atomized fluid undoubtedly exerts an influence. The salutary

effect of moist air in many diseases of the throat and lungs has been long recognized, and we know how frequently patients have recourse to inhalations of the vapor of hot fluids.

3. The temperature of the inhaled spray is a valuable factor in the production of the salutary effects of inhalations. An apparatus which permits greater latitude in this respect, as mine does, is deserving of attention.

4. Some inhalers, by the strength of their current, project the medicine very forcibly against the surface of the pharynx; these may, in suitable cases, exert a powerful effect by this mechanical influence after the manner of the douche.

5. Whether, as was stated by Sales-Girons, the diminished amount of oxygen of the inhaled media is of any importance, is still doubtful. However this may be, important effects can not be expected from the lessened quantity of oxygen received by the body during the short time daily spent in inhaling, aside from the fact that the diminution of the amount of the oxygen is not yet established.

6. Finally, a salutary effect on the respiratory organs has been ascribed to the deep, long, and slow inspirations necessary during the inhalations, and with more reason, whether we have in view the strengthening of the respiratory muscles or the mechanical effect on the lung-tissue itself.

Ramadge long ago proposed to cure tubercular phthisis by producing an artificial emphysema and bronchial catarrh, and contrived a mechanism which consisted of a metallic vessel covered with a lid having two openings. The smaller opening served as an air-hole, the other was connected with an elastic tube several feet in length and terminating in a suitable mouthpiece. The apparatus was partially filled with hot water, to which was added a handful of hops, a small quantity of wine vinegar, or a tablespoonful of turpentine, means which Ramadge considered inoperative, but which he added for moral effect and to satisfy the wishes of the patient. The patient inspired and expired through the elastic tube, and as the expired air escaped from the air-hole with some difficulty, the lungs, by the forced effort to overcome the obstacle, were to become expanded to the extent of emphysema.

I have given this rather digressive exposition to exhibit the value of the assertions which are frequently made by persons of defective scientific attainments, who, mistaking the new plan of inhalations for Ramadge's procedure, describe it as a fashionable process long ago in use, and, notwithstanding the efforts of the English physician, long ago forgotten.



## SPECIAL USES OF INHALATIONS.

HERETOFORE the chronic forms of the diseases of the pharynx and organs of respiration afforded the new plan of inhalations the largest and most satisfactory contingent of cases; not that the acute forms are less adapted to this method of treatment, but because the aid of the physician is naturally more frequently sought by the subjects of lingering diseases. The activity of medicated inhalations in diseases of the pharynx and respiratory organs is in direct proportion to the distance of the diseased organ from the apparatus, so that affections of the pharynx are much more rapidly and certainly cured than those of the larynx, and again the diseases of the latter organ than those of the bronchi and lungs. In the treatment of the diseases of the lungs, especially, much patience and perseverance is required by both patient and physician. How little discernment patients sometimes exhibit in this respect is almost incredible. I have known patients, who had been affected for years with bronchial catarrh or chronic phthisis, become discouraged after employing the inhalations for scarcely a week, and, their bright hopes frustrated, turn their back upon the

new method of treatment, because they were not immediately relieved of all their morbid symptoms. It is, therefore, a matter of interest to the physician not to awaken extravagant expectations in such patients.

A large number of pertinent observations from my own practice are at my command, which I intend to use when I have leisure for another publication, as I do not wish to enlarge the present work, in which I have in view a practical object, beyond the limits of a little book.



#### DISEASES OF THE NOSE.

I HAVE had no experience in the treatment of these affections with medicated inhalations, yet I would not hesitate in suitable cases, such as inflammations, ulcerations, ozæna, bleeding at the nose, etc., to employ inhalations of the proper medicated fluids, particularly in children, as they can not easily be taught to gargle or snuff medicines up the nose.

Waldenburg, who has had some experience in these affections, says: In dry catarrh of the schneiderian membrane, or corysa, the secretion is promoted and improvement rapidly effected by

inhalations of chloride of sodium and muriate of ammonia. During the inhalations the mouth, of course, should be closed, and the head so inclined that the pulverized fluid can easily reach the nasal cavities. Coryza with copious and putrid secretions is likewise ameliorated, the secretion diminishing, and the putrescency vanishing by the use of inhalations of alum and other astringents. In these cases, however, the application of nitrate of silver with a brush might succeed more rapidly. Frequently a combination of both methods of medication will answer the purpose best.



## DISEASES OF THE PALATE AND PHARYNX.

### I. CATARRHAL INFLAMMATION OF THE MUCOUS MEMBRANE OF THE PALATE AND PHARYNX. ANGINA.

#### I. *The Acute Form.*

THE acute form of catarrhal inflammation of the mucous membrane belongs, as is well known, to those affections which recur in persons once affected on the least exciting cause; it is, therefore, very frequently the object of medical treatment. The diseased mucous membrane of the pharynx, tonsils, anterior pillars, and uvula varies

in color from a light-red to a deep dark-red. The uvula, from its peculiar position and its relaxed submucous connective tissue, is liable to become much swollen, and to come in contact with the upper surface of the tongue; much hawking and an annoying cough generally result.

Gargles of astringent substances, which are extensively used in this affection, however serviceable they may be, have the disadvantage of aggravating the pain by the necessary movements of the diseased parts, aside from the fact that they do not seem to reach the deep-seated parts of the pharynx. (Fournier.)

In order to convince one's self of this limited local action of gargles, all that is necessary is to gargle with a solution of some coloring matter, indigo, for instance, and then to inspect the pharynx. The tongue near its root, the inner surface of the cheeks, the uvula, and the anterior pillars will be found discolored, while the posterior wall of the pharynx will be perfectly free from the coloring matter unless the process has been executed in the way suggested by Von Tröltsch, which consists in half swallowing it.

I have been more successful in acute catarrhal angina with inhalations of alum. In cases where the patient had previously suffered from attacks of a week's duration or more, I succeeded in sub-

duing the troublesome disorder on the first or second day by letting the patient inhale a strong solution of alum consisting of twenty grains to one ounce of distilled water; the patient inhaled five or six times in a day, each sitting continuing about fifteen minutes.

Tannin is used in such cases in doses of four to six grains to an ounce of distilled water, but I do not often employ it on account of its disagreeable taste and the sensation of dryness it produces. I have already stated that the inspirations should be superficial when inhalations are employed in diseases of the palate and pharynx.

*2. Chronic Inflammation of the Palate and Pharynx.*

Physicians more frequently have occasion to treat the chronic than the acute form of catarrhal angina. On account of the circumstance that chronic catarrh principally affects the posterior parts of the fauces, it is still less influenced by gargles than the acute disease. But so much can be accomplished by inhalations that even the opponents, as Fournier, speak favorably of the new mode of treatment. A very large number of successfully treated cases have been reported in the journals.

When we consider how frequently chronic pharyngitis, by gradually extending upwards and downwards, gives rise to pathological changes in the

larynx and the organ of hearing, not to mention the inconveniences which those affected by the disease suffer, the value of the new therapeutical measure, which promises a safe and speedy removal of the disease, can not be too highly estimated.

For some time I have examined every case of pharyngitis presented to my notice with the laryngoscope. Very frequently I find the posterior surface of the half arches and the part of the pharynx covered by them involved in the disease. I think therefore that we may safely ascribe the effectiveness of inhalations, at least in part, to the fact that the nebula comes in contact with these parts also, which are less easily reached by other kinds of local medication. In the treatment of chronic pharyngitis, I employ concentrated solutions of alum and tannin, twenty grains of the former and ten of the latter, to an ounce of distilled water. Frequently, after a few days' treatment, the dark-red colored mucous membrane becomes lighter, and the elevations vanish, while the subjective condition of the patient undergoes a corresponding improvement. Phlyctenulæ and follicular ulcers, when present, rarely resist this treatment long. The current should impinge against the diseased surface with much force, but it ought to have a low temperature.

Of course, there are many cases in the treatment

of which both physician and patient will have to exercise much patience. In that form of chronic pharyngitis called pharyngitis granulosa, which frequently affects excessive smokers and hard drinkers, I was often compelled to have recourse to inhalations of nitrate of silver, employing from five to ten grains to one ounce of distilled water. But I must not conceal that I was not always successful even with this remedy, and that I did not obtain the mastery over the granulations until I touched the affected parts with the nitrate of silver or iodine. But such cases are exceptions. Generally, recovery is very rapid under the use of inhalations of nitrate of silver, after all other means have been ineffectually employed.

Fieber describes a case of granular pharyngitis which was successfully treated with inhalations of a solution of tannin, to which alum had been added.

Sales-Girons says that he has experienced marked benefit in this disease after a few inhalations of sulphur-water. Demarquay saw granular inflammation of the pharynx disappear under the use of inhalations of tannin and the simultaneous employment of the mineral water of Eaux-Bonnes.

“When the acinose glands are the seat of inflammation, the accumulation of their secretion obstructs their ducts and produces an elevation of the

mucous membrane that covers their distended sacks. These glands are easily recognized by the yellow points produced by the secretion accumulated in their ducts. Here inhalations of substances which have the power of gradually dissolving the hardened secretion are indicated; as the bicarbonate of soda. If these do no good, we may have recourse to the application of the tincture of iodine.”—*Lewin.*

Inhalations of alum and tannin are almost useless in *pharyngitis sicca*, as Lewin calls one form of inflammation of the pharynx, of which I have encountered three well-marked cases. The spray of sulphur-water seems to be of greater service than astringents. But on the whole, in this affection, which presents a smooth, dry, thin, and very red mucous membrane, and which seems to be owing to atrophy of the glands, no form of local medication can be expected to be attended with more success than the means used for the promotion of the growth of hair, the loss of which depends on the disappearance of the hair follicles.

If ulceration has supervened in cases of chronic catarrh, we should have recourse to inhalations of nitrate of silver, combined with suitable general treatment.

It is hardly necessary to remind the practitioner that smoking and the use of spiritous liquors must



be totally forbidden during the employment of inhalations for the cure of pharyngeal inflammation.

2. CROUPOUS INFLAMMATION OF THE PHARYNX. PHARYNGEAL CROUP.

I have had the opportunity of observing two cases of croup of the pharynx, but in these cases the inflammation constituted only a part of a croupous inflammation, which extended also over the larynx.

It is well known, however, that this disease may occur when the neighboring parts are unaffected, either as a result of intense catarrhal inflammation, or as a sequela of typhus fever and pyæmia.

In such cases it would be proper, as in diphtheria of these parts, to make use of inhalations of nitrate of silver, tannin, lime-water, or as has been highly recommended, of chlorate of potassa.

3. PARENCHYMATOUS INFLAMMATION OF THE PHARYNX. ANGINA TONSILLARIS.

1. *The Acute Fever.*

In catarrhal angina the vessels of the mucous membrane are overloaded, the membrane itself is swollen and softened, and the secretion, which depends on a more rapid shedding of the epithelial scales and augmented formation of new cells, is greatly increased; but in this form of inflammation, which is one of the most frequent diseases

befalling man, a coagulable plastic exudation also takes place in the connective tissue of the tonsils and the submucous tissue of the pharyngeal mucous membrane.

As astringent gargles are attended with considerable success in this affection, if used sufficiently early, there is reason to expect much benefit from inhalations of alum, tannin, and nitrate of silver.

I have had occasion to employ inhalations only in that stage of the disease in which the hope of producing resolution of the inflammation is no longer warranted, but in which the object of treatment ought to be the acceleration of the formation and discharge of pus.

In several such cases, besides using the cold water dressings externally, I directed my patients to inhale the spray of pure water very near the apparatus, as it is then warmest, and, acting after the manner of a catap'asm, fulfills its object in the shortest possible time. The patients thus treated declared that this procedure was much more agreeable and relieved the pain more effectually than the troublesome gargling with warm ptisans and decoctions, which is scarcely practicable on account of the tension of the diseased parts and the almost complete closure of the mouth.

As soon as the yellow color and softness of a circumscribed part of the tonsils admits the conclu-

sion of the presence of pus, the evacuation should be aided with the bistoury.

2. *The Chronic Form.*

In the chronic form of tonsillitis, the so-called hypertrophy, I have abstained from inhalations, because the extirpation of the enlarged gland, which I had occasion to perform more than twenty times in the last two years, answers the purpose much more rapidly. The penciling of the hypertrophied gland with nitrate of silver or tincture of iodine did not produce the least diminution of the volume of the gland, although I continued this treatment for months. In regard to the use of chromic acid, which has lately been recommended, we lack experience.

If an inhaler is at hand when the extirpation of the gland is completed, the patient might inhale a small quantity of alum or chloride of iron to arrest the bleeding more rapidly, which, however, is generally inconsiderable.

4. SYPHILITIC AFFECTIONS OF THE PALATE AND PHARYNX.

Pharyngeal catarrh, occurring in individuals who are laboring under an attack of syphilis, or who were formerly affected by the diseases, is not always an indication of the continuance of the diathesis,

and it would therefore be inexcusable to place such patients at once under the antisyphilitic treatment. Several such individuals under my care were attacked by severe forms of angina on resuming the habit of smoking, but were very rapidly relieved by inhalations of alum.

When the disease of the fauces and pharynx stoutly resists this simple treatment, or when condylomatous excrescences, and ulcers of the pharynx, or other signs of constitutional syphilis are present, it would be folly to adhere to such indifferent remedies.

In such cases inhalations of corrosive sublimate (1-2 grains to an ounce of distilled water) will relieve the symptoms with astonishing rapidity, as has been fully established by the experience of Briau, Demarquay, Lewin, Schnitzler, and Waldenburg.



## DISEASES OF THE LARYNX.

### I. CATARRHAL INFLAMMATION OF THE LARYNX.

#### 1. *Acute Laryngeal Catarrh.*

I HAVE repeatedly employed inhalations of alum and tannin in the treatment of patients who had a rough, hoarse voice, and complained of a tickling sensation and soreness in the region of the

larynx, who had severe paroxysms of a cough which was attended with but little expectoration; in short, who presented all the symptoms of acute laryngeal catarrh. This treatment was not successful. On examining the affected parts with the laryngoscope after the inhalations, no diminution of the morbid anatomical changes could be observed. In consequence, I now adopt the old mode of treatment, keeping my patients in bed on a spare diet.

When I have thus overcome the pain and soreness, and the indication to increase the secretion alone remains, I employ inhalations of muriate of ammonia, four grains to an ounce of distilled water, several times a day, the patient sitting very near the apparatus.

I think the want of success of the astringent inhalations in the cases above alluded to may be explained by the fact that all of the patients inhaled at my rooms, and, on going to their homes, exposed themselves to the cool air.

Waldenburg obtained excellent results from the use of very dilute solutions of common salt, from one to two drachms to two pounds of water.

In one case where the patient lost his rest at night from a constant disposition to cough, and consequently became much debilitated, I was induced, in order to give rest to the irritated larynx,

to make use of inhalations of a solution of acetate of morphia (gr. 1) in concentrated bitter almond water, (drs. ii). The experiment was highly successful. This treatment therefore deserves further trial in suitable cases, particularly as the stomach and bowels are exempt from the effects of the active narcotic.

The inhalations were so arranged in this case that the patient inhaled six times, at equal intervals, twenty drops of the above-named solution in an ounce of distilled water, the whole ounce being consumed each time.

### *2. Chronic Laryngeal Catarrh.*

This disease, which is always marked by a continuous alteration of the voice, affords very frequent opportunities of adopting the new therapeutical measure. It may be safely asserted that all simple catarrhal inflammations of the larynx, if they have not continued excessively long, may be greatly improved, and nearly always cured by inhalations.

But, if we would profit by the new mode of local treatment so as to have a standard for future cases, a thorough laryngoscopic examination of the affected larynx should always be instituted before the treatment is begun, particularly as this disease presents a considerable variety of anatomical changes of the mucous membrane.

Frequently patients have been sent to me who thought their lungs affected and who were strengthened in their opinion, at least in part, by their physicians, and yet whose thoracic organs were found, on close examination, to be intact while the larynx presented marked anatomical lesions, and *vice versa*.

Here the usefulness and significance of the laryngoscope were strikingly exhibited, for without the certainty established in the diagnosis with its aid, the success attained by the inhalations, and the conclusions deduced therefrom, would have rested on false assumptions. Among the many means hitherto used in the treatment of laryngeal catarrh a proper selection should be made according to the condition found on laryngoscopic examination.

1. If the catarrh is of recent origin, the hoarseness being attended with moderate cough, scanty expectoration, slight difficulty in breathing, and if no other changes in the tissue of the affected organ are found than those belonging to simple chronic inflammation of the mucous membrane (a dark-red or dirty bluish color, an uneven granulated appearance, swollen mucous follicles, moderate thickening and reddish discoloration of the vocal chords, coarser outlines of all the parts entering into the anatomical composition of the larynx instead of the slender and graceful forms of health) inhalations

of alum, tannin, and in bad cases nitrate of silver, are to be employed several times a day.

Improvement in the voice is generally noticed in a few days, and the laryngoscope exhibits a more healthy appearance of the parts.

Such cases as that described by Schnitzler, where the patient suffered from hoarseness for several years, and from complete aphonia for six or eight months, and recovered his voice after employing inhalations of alum for two days, encourage us not to doubt the possibilities of a complete cure in the most inveterate cases by the use of medicated inhalations..

2. In cases presenting similar anatomical lesions, the patients, however, being less annoyed by the cough, hoarseness, and pain than by the constant secretion of mucous, which muffles every word spoken and almost drives the patient to despair, I prefer in the beginning inhalations of muriate of ammonia, or common salt. By this course, although it is only palliative, the troublesome symptoms are nearly always rapidly relieved and the voice of the patient improved. But in order to effect a radical cure, we will soon have to substitute astringents, alum, tannin, nitrate of silver, for the resolvents.

3. But if, on laryngoscopic examination, we not only find the anatomical changes of simple chronic catarrh, but more profound lesions depending on a



longer duration of the nutritive disturbances, as catarrhal erosions, ulcers from the disintegration of swollen mucous follicles, finely granulated circumscribed elevations resembling condylomata, we may have recourse to inhalations of alum or tannin at first, but will soon have to employ the atomized solution of nitrate of silver; (2-10 grains to 1 ounce of distilled water.)

We will, however, not always succeed even with concentrated solutions, which must not be made too strong, lest we injure the parts of the mucous membrane still intact. Occasionally I have been compelled to have recourse to nitrate of silver in substance, or to applications of a concentrated solution with a camel's hair brush, or what I find still better, to insufflations of nitrate of silver and lactine, (1-2 parts to 10,) making use of the laryngoscope as a guide.

The complete restoration of the lost voice is possible only in those cases in which the vocal chords have not suffered any considerable loss of substance by the ulcerative process. Sometimes the voice is completely lost during the reparative process in consequence of cicatricial contractions of the vocal chords, a very ungrateful feature of our specialty; for while a patient who has lost his eye by an extirpation of the globe is satisfied with an artificial substitute, patients with laryngeal disease,

in whom dangerous ulcers of the vocal chords have been cured, hardly believe that they owe a debt of gratitude to the physician if they have not at the same time been restored to a perfect use of the voice.

4. Polypous excrescences, which are not seldom found in long-continued cases of laryngeal catarrh, either in the form of papillary enlargements or mucous polipi, must be removed by operative procedure. But the bleeding, collateral determinations and profuse purulent secretions, which often attend such excrescences, can generally be combated with inhalations.

5. Finally, as the last termination of chronic laryngitis, we must consider the hypertrophy and induration of the sub-mucous connective tissue by which the caliber of the larynx is often considerably diminished. The vocal chords particularly are subject to hypertrophy from very protracted catarrhal processes, whereby they become rigid, and lose the ability to vibrate. For this residuum of other morbid processes which have been successfully treated, Waldenburg and Lewin recommend inhalations of tincture of iodine or iodide of potassium.

## 2. CROUPOUS INFLAMMATION OF THE LARYNX. CROUP.

Bretonneau's procedure of applying a strong solution of nitrate of silver to the inflamed mem-

brane of the larynx by means of a small sponge, having been accepted by all physicians on account of the marked success attained by it, it was natural to expect to find a successful remedy for this destructive disease of tender childhood in the new therapeutical measure.

And, indeed, many cases have been reported in home and foreign journals in which this disease was successfully combated with inhalations. That inhalations are unsuccessful in those sad cases where, notwithstanding the removal of the croup membranes from the larynx, life is still lost on account of the poisoning of the blood, is a deplorable misfortune, which the new therapeutical process shares alike with every other kind of local treatment, and even with tracheotomy itself.

The pathology of membranous croup, which is more frequent in northern and in low and damp localities than here, consists in the exudation of a plastic material, which, becoming concrete, lines the narrow caliber of the infantile larynx, and prevents in a mechanical way the entrance of air into the lungs.

Happily, this disease is not so frequent as it is supposed to be by non-professional persons. The prevalence of this erroneous opinion as to its frequency undoubtedly proceeds from the contemptible conduct of many physicians who declare

every case of catarrhal inflammation of the larynx in children which may present some of the symptoms of croup, whistling respiration, dyspnœa, and barking cough to be a case of pseudo-membranous croup. Thus parents frequently tell the *new* doctor that their children have surmounted croup three or four times, and that, restored by simple means, they were able to run about in a few days. As already stated, laryngeal croup is neither so frequent nor so easily relieved, and the remarkable success of the treatment may very generally have depended on a mistaken diagnosis, or, what is still worse, on selfish deception.

In a very severe case in my own practice, the child of the publisher of these pages, two years of age, all the symptoms of this sad disease had manifested themselves in a fearful manner. The ordinary treatment had been of no avail, and nothing more seemed able to hold the already fleeting life of the poor child. I thought of inhalations of tannin and nitrate of silver. But as an accurate consideration of the symptoms, which were becoming more menacing from moment to moment, induced me to attribute the cause of the want of air less to obstruction of the larynx by false membrane than to a large quantity of very tenacious mucus which the child was unable to expel, I persuaded the parents to permit me to

employ the spray of warm water, which was directed into the face of the little patient.

Although I could not suppress the fear that the swelling of the inflamed mucous membrane might be increased and the almost insufficient space be still further diminished by the influence of the warm spray, yet the hope of dissolving the mucus predominated over my fears.

After inhaling the warm spray for a quarter of an hour, the child breathed easier, and was evidently relieved. The inhalations were continued uninterruptedly day and night for twenty-four hours, during which time a large amount of mucus unmistakably mixed with flocculi of false membrane had to be removed from the mouth of the child by the mother. The child now rallied and was ultimately cured.

There could be no doubt as to the correctness of the diagnosis, as all the symptoms of croup, besides the membranous exudation on the tonsils, were present. Moreover, the brother of the little girl was simultaneously attacked with scarlatina.

A few weeks ago I had another opportunity of making use of inhalations in a case of croup, in a boy five years old. Though the inhalations of tannin afforded some relief to the terrible sufferings of the little patient, who submitted to the measure in a most affecting manner, yet on the next morning

he was a corpse. Perhaps I ought to state that the case was a most desperate one, and that the previous treatment, consisting in the application of large blisters and enormous bleedings, had greatly enervated the child.

I regret that my limited space will not permit me to give the results obtained by other physicians so fully as the importance of the subject deserves.

Barthez treated in the "Hopital des Enfants" four cases of croup and laryngeal dyptheria, by means of inhalations of tannin, and had the opportunity of observing the effects on the false membranes. The respiration became freer, the dyspnoea diminished, and the paroxysms of suffocation no longer occurred. Yet two of the children succumbed in consequence, it would appear, of the advanced state of the intoxication of the blood; at least, in one of the post-mortem examinations, nothing was found of the false membrane which had been diagnosticated.

Dr. Fieber treated fifteen cases of croup by means of solutions, containing from five to ten per cent. of tannin, which were employed from five to ten minutes every two or three hours day and night. Two-thirds of the cases recovered. His observations on the manner in which the croup membranes dissolve under the influence of the medicated spray

are highly interesting. He also calls attention to the fact that the alkalies are able to dissolve the croup membranes, and therefore deserve a trial in the treatment of croup in the form of inhalations.

Schnitzler had recourse to inhalations of the bromide of potassium (ten to fifteen grains to one ounce of water) in two cases of croup, and had the happiness of saving a child only six months old.

Another case, lately described by Professor Biermer, deserves to be mentioned here, particularly as it has regard to the use of atomized hot water and lime-water, which, according to Küchenmeister, are good solvents of the croup membranes.

A girl fifteen years old having presented the phenomena of a simple laryngeal catarrh for a week, was suddenly attacked by symptoms of suffocation, after which patches of croup membranes were expelled. The symptoms of obstruction again increasing on the following day, a trial was made with atomized hot water, which had such beneficial effects that boiling water was subsequently employed. For an hour she eagerly imbibed the warm steam, and distinctly perceived a diminution of the impediment to respiration. Then another strong paroxysm of coughing with the distressing symptoms of suffocation took place, by which, besides a considerable amount of puriform mucus, a circular piece of false membrane was expelled.

The respiration now became easy, and the patient felt greatly relieved. Encouraged by this result, Biermer ordered a repetition of the inhalations every two hours, but instead of simple water, used lime-water, hoping to dissolve the concretions still more rapidly.

The lime-water inhalations were frequently repeated for a few days, and each time continued for fifteen minutes. The medicine was employed warm and at the usual concentration of one to thirty parts. The cough became easy, the signs of croupous obstruction of the larynx diminished, and paroxysms of suffocation no longer occurred. In a few days she was fully convalescent.

Professor Biermer attaches much importance to the employment of *warm* lime-water. I am, however, inclined to the opinion that the issue of this case would not have been different if the warm steam had been continued, for on carefully considering the symptoms which followed on the first employment of the hot vapor, it seems to me that the force of the disease was already broken; however, I consider the use of lime-water highly rational in this disease.

### 3. ŒDEMA OF THE GLOTTIS.

Trosseau, the celebrated clinician of Hotel Dieu, had an opportunity of successfully employing inha-



lations of a strong solution of tannin in this generally fatal disease, which consists in a rapid and unexpected transudation of serous fluid into the loose areolar tissue of the larynx. The patient was able to leave the hospital after four days. In another case which was successfully treated, the surgeon had already been called to perform the operation of tracheotomy.

About half a year ago I had the opportunity of diagnosing a case of œdema of the glottis, which resulted from tuberculosis of the larynx, but for several reasons had to abstain from inhalations.

#### 4. ULCERS OF THE LARYNX.

I have not yet tried inhalations in the ulcers of the larynx which take place in the course of typhus fever and small-pox; nor have I seen any description of such cases.

In regard to

##### *Syphilitic Ulcers*

Of the larynx, which not unfrequently appear as an expression of the constitutional disease, what was said about syphilitic affections of the pharynx is equally applicable.

Trousseau pleads strongly for the employment of atomized fluids in these cases.

Demarquay cured cases of extensive mucous

patches of the half arches, pharynx and larynx, with inhalations of corrosive sublimate.

In two cases of syphilitic ulcers of the mucous membrane of the nose and pharynx, Schnitzler effected rapid cures with inhalations of corrosive sublimate.

The experience of Lewin and Waldenburg also speaks favorably for these inhalations.

I have already referred to catarrhal ulcers of the larynx when considering chronic laryngeal catarrh, so that there remains to be considered only

*Tuberculous Ulcers of the Larynx or Phthisis Laryngea.*

A case of tuberculous ulceration of the larynx which I examined with the laryngoscope in the beginning of my practice, had been treated by a former physician with insufflations of nitrate of silver, and had a very sad termination in consequence; this would have sufficed to admonish me to abstain from every kind of energetic local treatment, if I had not been convinced from *a priori* reasoning of the uselessness, nay, danger of such heroic interference. Indeed, a very moderate knowledge of the nature and significance of laryngeal phthisis, which is almost always associated with an analogous disease of the lungs, is sufficient to prevent one from making mistakes in this respect. We find, therefore, in nearly all

works that discuss this disease that it should be considered *a noli me tangere*.

In my opinion an exception to this rule is presented only in cases of non-tubercular affections of the pharynx and epiglottis, and catarrhal ulcers and erosions of the laryngeal mucous membrane, which occur not unfrequently in tuberculous patients, causing them great suffering.

Even the inhalations of weak solutions of alum, which some practitioners have recommended, have not resulted in any good in my practice; but the spray of warm water seemed to moderate the pain in the larynx and to abate the constant disposition to cough and clear the throat, particularly when small quantities of narcotics were added (tr. opii simpl., morph. acet., ag. amygdal. am.)

Two very accurate observers differ from this opinion. Waldenburg, in whose practice a tuberculous ulcer of the vocal chords vanished in a few weeks under the use of inhalations of a solution of alum (1-2 drs. to 2 lbs. of water,) believes that laryngeal phthisis is much less influenced by inhalations than the diseases already considered, but yet observes: "Although a complete cure can not be effected, still, in most cases, considerable improvement may be expected, some of the most tormenting symptoms will be appeased and even removed, a benefit limited indeed, but which can not

be too highly estimated." Lewin assures us that nitrate of silver inhaled in doses of from 1-2 grains to an ounce of water is an excellent remedy in the treatment of tuberculous ulcers of the larynx. In several cases recovery was rapidly brought about by the application of nitrate of silver, in substance. He says that he might relate a dozen similar cases.

The experience of Schnitzler, Leiblinger, and Wedemann is not much more favorable than my own. Niemeyer says that insufflations of lapis infernalis, and the application of a sponge saturated with a solution of nitrate of silver to the glottis, sometimes have a palliative effect, but are generally badly borne.

##### 5. MORBID GROWTHS OF THE LARYNX.

The history of the morbid growths of the larynx has undergone a complete change since the laryngoscope was introduced into practice. The hope expressed by Ruehle, several years ago, that by the aid of the laryngoscope we should succeed in removing benign, non-recurring, pediculated tumors, and only resign the patient to the rough, exuberant, and condylomatous cancerous growths, and then not until repeated operations temporarily successful have been performed, has already been splendidly fulfilled. The number of morbid growths of the larynx, diagnosed by means of the laryngoscope

during the last four years, is already considerable, and the number removed by its assistance not much less.

The employment of inhalations can be thought of only in very small excrescences. By means of the laryngoscope I discovered a reddish warty excrescence as large as a pin's head on the right vocal chord, at the yellow spot pointed out by Gerhardt, in a patient who had presented symptoms of secondary syphilis years ago. After inhalations of alum for two weeks, I succeeded in making it disappear with simultaneous improvement of the voice, which had been muffled. Another patient who harbored a broad-based mulberry-form growth between the anterior insertions of the vocal chords, was from time to time subject to sensations of tension, scratching and burning in the larynx, which I thought attributable to collateral determination of blood to the diseased organ. Inhalations of tannin never failed to afford the patient momentary relief from the intruder, which Prof. Bruns removed by an operation. There is no doubt that inhalations will be of great service in the arrest of the bleeding which follows the excision of morbid growths.

At another place I have already stated that syphilitic excrescences are rapidly removed by inhalations of corrosive sublimate.

## 6. HOARSENESS. APHONIA.

Hoarseness is not an independent disease, but only a symptom of the most desperate affections of the vocal organ. Whatever can unnaturally change the conditions necessary for the production of sound may produce hoarseness or loss of voice; as approximation of the arytenoid cartilages, tension of the vocal chords, or a current of air of certain force and rapidity.

In the previous pages we have already become acquainted with quite a number of diseases in which these conditions are altered, and the formation of voice much interrupted.

In the following I desire to direct attention to several forms of aphonia which depend on paralysis of the larynx.

1. *Hysterical Aphonia.*

Hysterical aphonia is not very rare among the diffuse disturbances of the functions of the nervous system which constitute the phenomena of hysteria. Pain, cough, and other symptoms of disease of the larynx are absent. Examination with the laryngoscope affords a negative, but none the less valuable result.

A patient who had lost her voice for several years was sometimes suspected of simulation and

sometimes supposed to have laryngeal polypi, or ulcers, by the physicians treating her at various times. The treatment to which she had submitted was of the most heterogeneous kind. When she sought my advice she was completely speechless, and could make herself understood only by writing her thoughts. A single laryngoscopic examination satisfied me that her larynx was intact, with the exception of a slightly granular condition of the mucous membrane. The vocal chords remained motionless, notwithstanding a painful effort to speak on the part of the patient. By tickling the uvula with a feather, a hardly audible cough was evoked, which the patient was unable to produce voluntarily. However short the time occupied in coughing, I satisfied myself that the vocal chords had somewhat approximated.

I now examined the patient more closely, and was enabled, from some other data, that need not be mentioned here, to conclude that the case was one of hysterical paralysis of the vocal chords.

Knowing that successful efforts had been made with local means in cases of persistent paralysis of the vocal chords from other causes, I directed my patient to inhale a strong solution of alum for three days, and had the pleasure of seeing her voice return to a slight degree. As the result remained nearly the same during the following days,

I directed her to Dr. Kerner, of Cannstatt, who subjected her to local faradization, and completely cured her.

2. *Rheumatic Aphonia.*

This affection is not very rare, and is generally caused by taking cold when the body is overheated.

A short time ago I had an opportunity of examining such a case with the laryngoscope. The vocal chords did not approximate the median line on an effort to produce the sound of *a* in that. All the other parts of the larynx were intact. The patient, a student who had exposed himself to the cold night air after a debauch, was perfectly voiceless.

Three vapor baths which the patient took had no effect. I administered inhalations of warm water several times a day. The voice improved rapidly, and was restored in a week.

Lewin describes an analogous case. Notwithstanding the use of external and internal means, including faradization, for from four to six weeks, no improvement could be observed. The endermic application of strychnia, the dose being gradually increased to half a grain, soon produced a permanent cure.



3. It is said that complete aphonia may be caused by over-exertion of the voice. I have never seen a genuine case of this kind. Cases which seemed to belong to this species, but in which anatomical changes of the larynx were detected with the laryngoscope, have repeatedly come under my observation.

This is the place to notice briefly an affection which I have several times had the opportunity of observing in female singers, and which consisted in a tremulation and want of clearness of the voice when it was raised to a certain pitch. These abnormal phenomena appeared suddenly during a laborious effort, and remained to the great alarm of the ladies. An examination with the laryngoscope proved that the larynx was perfectly healthy, and that the coaptation of the vocal chords during efforts at singing was normally performed.

Inhalations of alum produced a rapid and permanent recovery. Alum had been previously recommended in the form of gargles by Bertani in cases of aphonia from over-exertion.

Are not these affections, which may seem very trivial to us, but are highly significant to the individuals concerned, owing to alterations in the power of tension of the vocal chords of so subtile a character that they can not be observed by ocular inspection?

My services, however, have been sought by singers, actors, preachers, and teachers, not only in such trivial complaints, but far more frequently on account of severe disturbances of the voice. Intense pharyngitis and chronic laryngeal and tracheal catarrhs form a very large contingent of the affections which I have examined laryngoscopically in these persons. I have also repeatedly seen the depression of the epiglottis described by Lewin.

Trousseau long ago noticed the great merits of inhalations in the hoarseness of speakers and singers, and among the cases treated by Lewin, the number of such patients is strikingly large, and the results obtained are without a parallel.

#### 7. WHOOPING-COUGH.

Dr. Fieber first employed inhalations in the treatment of whooping-cough. A girl four years of age had this disease in an intense degree for two months. On the supposition that he was dealing with an affection of the vagus nerve, Fieber selected a medicine for inhalation which is supposed to have a special influence on this nerve. The following is the formula which he used: Extr. *alcoh. sem. hyosciami* gr. vi, *ol. olivæ* ℥i, *pulv. gum arabici* ℥ss, *aq. font.* ℥xxxii. After using the medicine for eight days the disease dis-

appeared. Fieber says he felt induced from the manner of the termination of this case to consider the simple *mixtura oleosa* of much more importance than formerly.

Gerhardt employed the solution of chloride of iron (3 gtt. to  $\bar{3}$ i of water) in the whooping-cough of a girl seven years old, after the disease had continued for nine weeks; the sputa, which before had been tinged with blood, lost the red color, and the diminution of the paroxysms was striking even after the first inhalation.

A few weeks ago I had an opportunity in the case of two children to confirm the extraordinary effects of medicated inhalations in whooping-cough. The disease had continued five days, and had attacked both boys, one aged three and the other five years, at the same time. In both the peculiar paroxysms of the cough were well marked, and in the older boy the tenacious sputa were tinged with blood. They inhaled twice daily, each time for ten minutes, a solution of one drachm of alum in six ounces of water. The success was greater than I expected. Even on the first night the attacks assumed a milder form, and the blood entirely disappeared from the sputum of the older boy. Improvement went on steadily, so that the younger boy was completely cured in a week, and the older one a few days later.

Though my experience is limited, yet every physician may see an inducement in it to try inhalations in the treatment of whooping-cough, in which, as is well known, all kinds of medication have accomplished little. The success of inhalations seems to confirm the opinion of those who hold that whooping-cough is not an affection of the vagus nerve, but rather a catarrhal disease of the respiratory mucous membrane caused by an epidemic influence.



## DISEASES OF THE TRACHEA AND BRONCHI.

### I. CATARRHAL INFLAMMATION OF THE TRACHEA AND BRONCHI.

#### 1. *Acute Bronchitis.*

THE cases of acute catarrhal inflammation of the trachea and its larger branches, the bronchial tubes, which I have had occasion to treat, were attended with so much general febrile disturbance that I hesitated as to inhalations, and preferred to keep my patients in bed under the ordinary regimen.

However, according to the experience of other physicians, we need not fear to employ inhalations

of muriate of ammonia and chloride of sodium in this disease. (Waldenburg.)

2. *Chronic Bronchitis.*

“Among the chronic diseases of the air-passages it is particularly chronic bronchial catarrh which offers resistance to all therapeutical efforts, and wearies both physician and patient. Whoever has had any experience in the treatment of this disease will recollect cases in which remedy after remedy was tried in vain, and it was finally necessary to send the patient to some watering-place or order a change of air. I am convinced from personal observation that the apparatus of Sales-Girons is to play a very important part in the treatment of this affection.”

These words, spoken by Fieber, who first greeted the new plan of treatment in Germany, I can fully indorse in view of the results obtained in the treatment of chronic bronchial catarrh by medicated inhalations. No kind of treatment of this frequent and obstinate affection, whether internal or local, can bear a comparison with inhalations. Cases, even the most inveterate, which can not be cured or greatly relieved by this method of treatment, certainly belong to the exceptions, and are probably owing to important organic or anatomical changes of the heart and lungs.

The therapeutical indications in the treatment of chronic bronchial catarrh vary with the different characters presented by the disease :

1. The disease runs its course as a simple irritation of the bronchial mucous membrane. The cough is not tormenting, the sputa, moderate in quantity, are easily expectorated, and no particular difficulty is observable in the breathing. No anomalies can be detected by percussion, and only large mucous rales are heard on auscultation.

In such cases inhalations of alum or tannin, with a small quantity of morphia, are exceedingly useful. Wedemann's success in a case in which he employed the following formula was very remarkable :

R.	Aluminis,	gr. 2;
	Morph. Acet.,	gr. $\frac{1}{20}$ ;
	Aq. dest.	ʒi, M.

In many cases chloride of iron seemed to me to be still more effectual.

2. If the disease takes the form of dry catarrh, the tenacious secretion being expectorated with much difficulty and distress, requiring protracted efforts of coughing, during which the contents of the stomach are frequently expelled, the sufferings of the patient will be increased by astringents, while resolvents and expectorants, muriate of ammonia, chloride of sodium, and carbonate of potassa, are especially indicated; even warm atomized water

alone will soon produce the desired fluidity of the secretion, and hence relieve the most tormenting symptoms. The addition of small quantities of narcotic medicines to the medicated fluid has a decidedly favorable effect on the cough. Inhalations of the *mixtura oleosa*, which Dr. Fieber recommends very highly, might also be tried.

3. If a patient affected with chronic bronchitis suffers from dyspnoea in consequence of a fresh attack of acute bronchitis from exposure to cold, as is not rarely the case, a procedure similar to that recommended for the acute affection should be instituted.

4. The efforts of the physician should be quite different, if the case is one of blenorrhœa of the mucous membrane. In such cases an amazing quantity of grayish yellow, generally fetid material, is expectorated with very little effort. While no abnormal condition of the thoracic organs is discovered by percussion, fine and coarse mucous rales, which rapidly change their place, are heard over the lungs.

Such patients are regarded by their relatives as consumptive, on account of the yellow sputa, particularly as the loss of proteinaceous compounds through the expectoration, tells on their general health in the course of time, giving rise to a feeble appearance and attacks of dyspnoea on slight exertion.

In such cases remedies which may restrain the secretion and restore the mucous membrane to its normal condition are indicated.

Dr. Fieber describes a case which is well calculated to exhibit the pure results of medicated inhalations :

The patient, who had been the subject of bronchial catarrh for twenty-five years, and latterly presented the symptoms of bronchorrhœa and emphysema, was cured in eight days with a visible improvement of his general health by the use of inhalations of a solution of sulphate of zinc, (grs. 5, to 1 ounce of water.)

Lewin expects excellent results in putrid bronchorrhœa from the employment of tar-water.

I am in possession of a complimentary letter from a physician in the northern part of Germany, who was cured of a bronchorrhœa of many years' standing by the employment of a pulverized solution of tannin.

## 2. DILATATION OF THE BRONCHIAL TUBES.

In cases of protracted inflammation of the lungs, in the course of bronchial catarrh, and in tuberculosis of the lungs, dilatation of the bronchial tubes frequently takes place either from contraction of the interstitial connective tissue, or from relaxation of the mucous membrane. In these sac-



ular enlargements, which sometimes reach the size of an egg, the secretion of the mucous membrane accumulates until the cavity is filled; from time to time it is expectorated in excessively large quantities, the patient being attacked by exceedingly severe paroxysms of cough, which are attended by retching and vomiting. The cavities being emptied, the patient is at ease until they are again filled and the secretion encroaches on the adjoining parts of the mucous membrane.

The sputum, which is characterized by great fluidity, diffuses an extremely disagreeable odor, and separates, after standing in the vessel for some time, into three superimposed layers.

If we consider that the amount expectorated by the patient in the course of time is very great, and that the secretion does not consist of indifferent constituents, but rather of substances of vast importance in the animal economy, on account of the albumen they contain, we can find nothing remarkable in the fact that the patient gradually loses his strength, that his constitution deteriorates in a suspicious manner, and that he is liable to perish of dropsy, hemorrhage, gangrene of the lungs, or the most frightful emaciation.

The object of rational treatment should therefore be to empty the cavities, from time to time, of their decomposing secretion which exerts an irri-

tating effect on the adjoining parts of the mucous membrane, and to alter in a favorable manner the secretion of the diseased mucous membrane.

To Scoda, the celebrated professor of Vienna, who is equally distinguished for his high merits in physical diagnosis and his sensible therapeutical views, belongs the honor of having first introduced inhalations of the vapor of turpentine into practice, a method of treatment which has been generally adopted on account of its great success.

But as the use of turpentine inhalations in the manner and with the contrivances which had been used was difficult for both physician and patient, it was very natural, since the introduction of the atomizer, to employ the pulverized solution of turpentine in the treatment of dilatation of the bronchial tubes.

Inhalations of tannin, creosote, and tar-water, which also act as disinfectants on the putrid mucus, seem to be no less effectual and certain than oil of turpentine.

By inhalations of tannin continued for a few weeks, in the case of a patient who had suffered for sixteen years from a putrid bronchial catarrh, latterly attended by bronchial dilatations and an abundant secretion, and whose strength was rapidly declining, Gerhardt succeeded not only in effecting a marked improvement in the cavities, but also in strikingly diminishing the cough and expectoration.

Waldenburg recommends the aqua picis. The strength of the solution should be at first from one to four drachms of tar to two pints of water, but it may be gradually increased, if the patient bears it well.

### 3. SPASM OF THE BRONCHIAL TUBES. ASTHMA.

Formerly, every case of occasional dyspnoea with difficult or incomplete expiration unattended by fever was called asthma.

Now this appellation is confined to that form of difficult breathing in which a morbid excitement of the function of the vagus nerve may be supposed to exist by which the contractile tissue even of the most extreme divisions of the bronchial tubes are spasmodically contracted, (in rare cases perhaps paralyzed.) Emphysema, diseases of the heart, organic changes of the large bloodvessels, which are frequently found in asthmatic individuals on post-mortem examination, act the part only of pre-disposing causes.

Material anatomical changes in the bronchial mucous membrane must be excluded in the diagnosis of nervous asthma.

Wistinghausen treated a young lady, eighteen years of age, who had emphysema of both lungs and asthmatic paroxysms, with inhalations of Fowler's arsenical solution, (10-15-20 drops to an ounce

of distilled water, once or twice daily.) After continuing the treatment for ten days, the asthma was entirely relieved, and did not return during the severe Winter and Spring of 1861.

Waldenburg's cases, which, it would seem, were complicated with severe bronchial catarrh, were treated by him with inhalations of chloride of sodium, tinct. of opium, oil of tar, and acetone.

Lewin praises inhalations of arsenic, and refers to the reputation this remedy has long enjoyed among the mountaineers in the treatment of asthma.

In a case of emphysema in my own practice, attended daily by two attacks of nervous asthma, the paroxysms were moderated by inhalations of chloride of sodium. An attack occurring in my office one day, I tried to abort it by the use of pulverized solution of table salt, bitter almond water, and arsenic in succession, but notwithstanding it increased to its usual severity.

Unfortunately the patient relinquished the treatment.

## DISEASES OF THE LUNGS.

## I. EMPHYSEMA.

I N this disease of old age particularly, which is familiar to every physician, patients complain principally of the symptoms occasioned by the bronchial catarrh which is almost always present. The treatment of emphysema therefore does not differ from the local medication recommended for bronchial catarrh.

As old and neglected cases of bronchial catarrh frequently cause emphysema, and as the new therapeutical measure is attended by the most happy results in this affection, it deserves to be considered as the best prophylactic of emphysema.

The anatomical changes of emphysema consisting in an enormous expansion of the air-vesicles which have lost their elasticity, can no more be benefited by medicated inhalations than by the remedies usually, but improperly recommended for this purpose; as, strychnia, ergot, and emetics.

I am therefore unable to understand Leiblinger who says that the new plan of treatment celebrates its greatest triumph in the treatment of emphysema, while he excludes bronchial catarrh from this prerogative. His explanation that inhalations have

such favorable effects in emphysema, because the lungs, with the exception of the expansion of the finest air-vesicles and the chronic catarrh, are not organically changed, and that, consequently, the whole of the lungs being employed in breathing, the greater part of the atomized fluid is inhaled, and comes in direct contact with the bronchial mucous membrane, seems to me to contradict the physical facts. The loss of the elasticity of the emphysematic air-cells renders expiration sadly ineffective; consequently, the succeeding inspiration carries but little air and therefore but little atomized fluid into air-cells already largely filled with residual air.

The external appearance of an emphysematic chest corresponds perfectly to the abnormal condition of the air-cells. During inspiration the ribs are seen to separate from one another very slightly, the whole thorax is moved upwards only and imperfectly expanded. On auscultation we fail to hear the vesicular murmur which is caused by the penetration of the air into the cells.

Leiblinger invariably employs rectified spirits of turpentine, one drop to an ounce of warm water, or the oil of cade, two drops to one ounce, in the treatment of his emphysematic patients.

## 2. CROUPOUS INFLAMMATION OF THE LUNGS. PNEUMONIA.

The employment of inhalations of suitable remedies, for instance, warm water, and lime water, in croupous inflammation of the air-cells, as well as in croup of the larynx, would seem to be highly rational.

Yet we hear nothing of the use of inhalations in this disease; this must be attributed to the hesitation of all thinking physicians of adopting such treatment in a disease attended by so much fever and constitutional disturbance.

Auphan, however, speaks favorably of the use of the mineral water of Euzet-les-Bains in hepatization, but he also considers inhalations contraindicated before the subsidence of the inflammatory fever.

## 3. GANGRENE OF THE LUNGS.

This disease resembles dilatation of the bronchial tubes in many respects, so that the treatment recommended for the latter affection is equally adapted to gangrene of the lungs. With the exception of a statement made by Trousseau, who seems to have used atomized tannin in gangrene of the lungs, I could find nothing pertinent to *our present subject* in the writings on inhalations.

## 4. CONSUMPTION. PHTHISIS PULMONALIS.

During my long residence in Italy I became acquainted with quite a number of those individuals with marble-colored faces, streaked with blue veins, who are found in all climatic watering-places. They are generally young persons, with blonde sleek hair, large blue eyes, prominent stature, who discover at first sight their Germanic extraction. They love to stand about in the open air so as not to lose any of the rays of the Italian sun. Their physicians send them into a foreign land from a great distance after years of treatment with cod-liver oil, iceland moss, asses' milk, and issues. I know the many tortures and sufferings of these poor patients, the thousand hopes and plans with which they drag out their lives until the last breath, joyless, but full of illusions. For many of them I soon afterward closed the weary eyelid. Now nearly all rest on the sunny Campo-Santo of Lucca, or in the solemn shadow of the cypresses of the cemetery of Livorno. Nearly all had been sent too late, after Death had already laid his icy finger on their hearts, and none seemed to understand the words written over the door of Italy for the belated: "Lasciate ogni speranza, voi ch' entrate."

But away with these sad, yet sweet recollections;



still let me impress on all whose lungs are affected not to seek the restoration of their health in the South when it is too late. I consider it inexcusable to burden poor patients who are *in extremis* with the hardships of traveling and sojourning in a foreign land where, not understanding the language, bereaved of the kind nursing of friends and relatives, forsaken and homesick, they live along sadly, to be buried finally in strange ground.

Great errors are committed in the selection of places for the restoration of health, about which I may express myself more fully at some future time. Notwithstanding the praise lately bestowed on Nice by some medical journals, I consider its climate injurious to most tuberculous individuals, and can only explain the frequent choice of this merry and interesting seaport city by the general ignorance as to the climatic and other conditions of most of the places sought by invalids.

The injurious influence exerted on many forms of disease of the respiratory organs by the combination of territorial conditions of some climates is not easily studied at the places themselves, for as soon as the severities of Winter have fully set in, many of the foreign patients leave the unfavorable climates, convinced that they can not endure the air. I have not unfrequently met large companies of such fugitives from Meran, Venice, and the south

of France, going still further south to seek more suitable Winter quarters.

In regard to the use of the medicated spray in tuberculosis of the lungs, I must admit in the premises that patients will not find a specific in the new therapeutical measure. It does not occur to me to believe that this affection, which depends on constitutional deterioration generally first manifested in the lungs, can be cured by local treatment; yet, I am certain that, accompanied with proper general treatment, advantages may accrue from inhalations, which can not be obtained from any other mode of treatment.

Though science may not possess a specific remedy for a certain disease, yet the patient affected by it may be very greatly benefited by rational medical treatment. In such a case we should endeavor to adopt that course which will be most likely to remove the annoying symptoms. While thus mitigating a part of the tortures of the patient, we not only procure for him quieter nights and happier days, but we gain such an advantage over the disease that a great improvement in the general condition of the patient and a tendency to a complete removal of the constitutional disease becomes manifest.

Lately I had an opportunity to observe the great benefit which may accrue to a patient from rational

symptomatic treatment in a boy four years of age, who was brought to me by his mother, on account of a sickly appearance and a poor appetite. The little patient presented the signs of scrofula. In my opinion the internal administration of medicines avails little in this disease, but I attach the highest importance to the improvement of nutrition by suitable hygienic measures. The mother had already adapted the latter to the condition of her child, according to the most approved rules. But as the boy had a copious discharge from both ears, I determined to subject this to local treatment. My expectation of favorably impressing the general condition of my little patient by curing the local manifestations was not disappointed. After proper treatment had been continued for fourteen days, the discharge from one ear was wholly arrested, and from the other to a great extent; while an essential change for the better in the appearance of the child became evident from this time.

I am convinced from my experience in the treatment of several tuberculous individuals, and from the statements of other writers on inhalations, that a great part of the most troublesome symptoms may be mitigated and even removed by the employment of inhalations; and it must be obvious that the constitution of the patient may thus gain time to improve. In short, there can be no doubt that

inhalations, acting in the mode indicated, may exalt the general condition of the patient in the most happy manner.

The means employed for the improvement of the constitution of tuberculous individuals, which are familiar to every intelligent physician, do not lose in their importance by the adoption of this local treatment. Above all I desire to caution these patients who anxiously seize every new remedy presented, against trusting that host of secret medicines which are designed to deplete their purses. It is almost incredible how persons, who exhibit an almost painful anxiety in the choice of articles of food, will not hesitate to burden their stomachs by the pound with the remedies vaunted in the newspapers, of whose composition they are ignorant.

This reflection gives me an opportunity of saying a word about cod-liver oil.

No other remedy of the *materia medica* has been so differently viewed as cod-liver oil. Whilst some praise it as a true panacea for tuberculous and scrofulous affections, it is of no value whatever with others. Those who consider it a mild promoter of nutrition occupy a middle ground.

I must acknowledge that I have not been able to convince myself, either from my own or the practice of others, that this disgusting oil, obtained

from the rotten livers of cod-fish, has any curative effect. Some months ago I placed a patient of mine, who has a cavity in his right lung, on the use of the oil. As he bore it well he increased the dose to twelve spoonfuls daily. After continuing its use for two weeks, his weight had increased five pounds, and the fullness of his body had visibly augmented.

But was this a sign of improvement? All the other symptoms of the patient remained the same, except that the appetite, which before was excellent, began to diminish, and that a tendency to diarrhea was established. I might add other analogous instances. Yet I am very ungrateful to cod-liver oil, for to it I owe many successes, of course not to its use, but to the interdiction of its further employment in patients who had been using it under the direction of other physicians.

The administration of cod-liver oil, although we may not be able to ascribe any detrimental qualities to it, has one evil consequence. The patient takes the medicine regularly in the belief that all is done, and neglects the more important laws of health, on the observance of which his recovery almost solely depends.

Before considering the indications for the use of inhalations in the treatment of phthisis, I must confess, to my regret, that in this disease also no

precise rules for the employment of inhalations have been established. Still it would be highly irrational to renounce entirely a methodical course, and resign one's self wholly to empirical experiments; for, however multiform tuberculosis of the lungs may present itself, from observing a large number of cases, certain general rules may be deduced which will serve as guides in the treatment of new cases.

I believe, therefore, that I can not be charged with premature scheming if I lay down the following rules based on a large experience. It is hardly necessary to state that besides the cases on which I have based my statements, there are many others which occupy a sort of middle position, of which it is doubtful whether they belong to either category.

1. A patient has a short, dry cough, which becomes worse during every spell of cold weather, and is attended by an annoying sensation of tickling in the larynx. The cough exacerbates in the morning and evening. The sputum consists of an almost transparent grayish mucus, which not rarely exhibits a red tinge from the admixture of blood. As long as the patient remains quiet respiration is easy, but it becomes difficult and is attended by palpitations whenever he makes any strong exertion. In the evening fever frequently occurs, the

patient's hands feel hot, and the cheeks present the suspicious circumscribed blush.

Generally the appetite is good, consequently the strength is not much diminished, but the general appearance of the body is delicate.

The construction of the thorax is faulty. Percussion often detects nothing, but generally we succeed in discovering pathological changes of the lungs in one or the other sunken infraclavicular region. The information obtained from auscultation is positive; in the situations which tubercles usually prefer we hear all the signs of bronchial catarrh; elevation of the pitch of both inspiration and expiration, prolongation of the latter, and dry and moist rales.

Mensuration of the thorax and measurement with the spirometer indicate a diminution of the capacity of the lungs.

In this stage of the disease, which corresponds more or less with the first deposit of tubercles in the pulmonary tissue, only the signs of a catarrh of the bronchial tubes can be elicited by a physical examination, and to this most of the symptoms of the patient must be attributed.

Consequently, the removal of this should be our object in the employment of inhalations, for in its continuance or extension consists the great danger threatening the patient. Among the as-

tringents which may seem applicable, I prefer the liq. ferri sesquichlor. (from 1-2 drops) with aq. amygd. am. conc. (20 drops to one oz. of water.)

I have repeatedly succeeded by the persevering use of this simple medication, which I always adapt to the strength of my patient, in retarding the progress of the disease, in removing the catarrhal phenomena, and in effecting such an improvement in the general health that only the continuance of the physical signs restrains what would otherwise have been a too favorable judgment of its success.

In order to explain the favorable influence of inhalations in incipient tuberculosis of the lungs, we are not forced to the admission of a direct influence of the medicated spray on the tubercle itself; all that we expect from it is the prevention of any further deposit, and the postponement of the softening of that already deposited by the removal of the bronchial catarrh.

If Rheiner's opinion were true that the softening of the yellow, cheesy tubercular matter always depends on ulceration of the bronchial tubes which pass through it, the efficacy of inhalations would be self-evident.

All tuberculous patients do not bear inhalations of astringents equally well in the beginning, and it is therefore advisable to commence the treatment



with inhalations of the spray of pure water very near the apparatus, and afterward to add the medicine in gradually increasing doses.

The great irritability of the mucous membrane of the fauces and pharynx which often becomes highly annoying when laryngoscopic examinations are made, should be so far regarded as to avoid a too powerful current of the atomized fluid, and to keep the pressure down to 1° of the thermobarometer.

The employment of inhalations requires much caution and an intelligent consideration of the general condition of the tuberculous patient. The physician should, therefore, not permit himself to be led into an excessive employment of the inhalations by the impatience and zeal of the patient, who thinks he has found the long-sought rescue in the new mode of treatment.

In several cases I saw the most serious results follow from a disregard of this rule. Thus, a consumptive patient inhaled when feverish, by direction of a practitioner, thirty drops of oil of turpentine in an ounce of water. Very alarming symptoms immediately followed this imprudence.

2. Our patient is no longer in this favorable condition; that his disease is consumption is evident even to non-professional persons.

The cough is severe and troublesome. The

grayish yellow, copious sputa, exhibit on microscopic examination the characteristic waved elastic fibers. In the cup it assumes the nummular form. The patient has fever after meals. Sleep is much disturbed, except toward morning, and then the patient awakes bathed in perspiration. Respiration is rapid and becomes difficult if the sputum is not easily discharged.

Emaciation is apparent. The appetite is variable, sometimes very good. There is much thirst. The physical examination now indicates greater involvement of the lungs. Every thing points to a fatal issue except that the star of hope shines brighter than ever in the dark horizon of the patient.

The patient having arrived at this stage, that of softening of the tubercles, no kind of medication, whatever its character, can exhibit very favorable results. As the disease, however, often remains stationary for some time, as even large cavities may heal up entirely, as has been shown by post-mortem examinations, it would be cruel to resign the patient to his fate without endeavoring to arrest his disease.

One must become familiar with the sufferings of these poor patients by prolonged personal observations, and not simply by short daily visits, in order to understand how much their welfare depends on

the ease of expectoration. When large bronchial tubes are obstructed by the tenacious secretion, when the cavities are filled with their undulating contents, and when whistling and sonorous rales accompany every breath, the patient feels highly dissatisfied with his condition. He complains of difficult breathing, of a sensation of pressure in the chest, and of a tormenting disposition to cough and clear his throat.

Not until the annoying contents have been expectorated, frequently in such large quantities as to fill the cup, do the hours become tolerable for the poor patient.

In order to alleviate the painful efforts required for the expulsion of the sputa, I employ several times a day, and generally with marked success, inhalations of common table salt, (5 grains,) or muriate of ammonia, (10 grains to an ounce of distilled water,) and if these are too irritating, warm water, very near the inhaler, at a pressure of 1°.

After a few inspirations, the patient coughs more frequently, and the sputa are removed from the moistened air passages with greater ease.

As patients in such a bad state of health are obliged to spend a large part of the day at home, we may, for the same purpose, produce an artificial sea atmosphere in their apartments by atomizing culinary salt for half an hour at a high pressure.

After the lapse of an hour, the presence of the atoms of salt may still be recognized in the air by the red glare of the flame of a candle.\*

The value of such medication in the treatment of tuberculosis of the lungs does not alone consist in the ease with which the mechanical impediment to respiration is removed, and the oxygen necessary to hæmotosis again supplied, but also in the favorable influence which it exerts in an indirect manner on the general health of the patient. May we not, by emptying the bronchi and the cavities before their contents have become putrid from long retention, and have imparted deleterious matters to the blood circulating in the lungs, prevent many of those general disturbances so much resembling pyæmia?

Though the advantages of inhalations in the conditions which we have described are great, yet they have only a palliative effect. Hence, it was natural to endeavor to exert an alterative and astringent influence on the bronchial mucous membrane, and, if possible, on the walls of the cavities, especially after these are freed of their secretion, and present a much more accessible surface to the action of the

\*Becker, of Moscow, reported two cases of tuberculosis in 1846, whose recovery he attributed to their prolonged residence in an atmosphere containing the vapor of water, and particles of common salt and muriate of ammonia.

atomized fluid than when covered by mucus. To fulfill this indication, I direct my patients to pause for fifteen minutes after having inhaled the common salt, and then to employ a solution consisting of two drops of the solution of chloride of iron, twenty drops of bitter almond water, and one ounce of distilled water.

In several cases, though not in all treated, I have succeeded in markedly diminishing the secretion and improving the general health of the patient.

Aqua picis, (1-3 ozs. to 2 lbs. of distilled water, gradually increasing the dose,) first recommended by Waldenburg, is better borne than common salt by some patients, and seems to me to correspond in its mode of action with the course of treatment just described. During the inhalation its action is that of an expectorant; but when the air passages are cleared, the balsamic medicine exerts the astringent and alterative influence on the mucous membrane justly attributed to it.

Several of the more important symptoms which arise in the course of tuberculosis of the lungs demand a brief notice.

1. *Cough.* For the troublesome dry cough of tuberculous individuals by which only small quantities of yellowish mucus are expelled after long and painful efforts, I have several times employed a

solution of acetate of morphia in concentrated bitter almond water with decided advantage. Frequently this is the most annoying symptom of which patients complain; it takes their breath whenever they exert themselves. Their head, they say, threatens to burst during the attacks of cough, and at night their rest, so necessary for them, is greatly disturbed.

The internal use of narcotics for these phenomena is well established; but that inhalations possess greater advantages must be obvious; for in this procedure the sedative medicine may act locally in the subduction of pain and irritation. The alimentary canal is thus spared, an advantage which can not be too highly estimated when we consider that the undisturbed functions of the stomach is almost a question of life for the consumptive patient.

We might, *a priori*, hesitate about the employment of narcotics for these symptoms, fearing that expectoration might be checked, and dyspnœa increased. But these results do not follow. When the cough ceases, the secretion collects in the lungs and bronchial tubes, and is afterward expelled from these organs in larger quantities with fewer and less severe attacks of cough.

According to Waldenburg, the dry irritating cough of consumptives is best relieved by an infusion of linden flowers.

By others alum and tannin are used. I am not in favor of this treatment, and feel disposed to believe the success ascribed to alum and tannin in such cases is generally due to the opium added to the astringent solution. In the tuberculous individuals whom I examined with the laryngoscope, the larynx was generally anæmic, so that I can not even theoretically explain the utility of the local application of astringents. The spray of pure water should be more frequently resorted to, particularly when the cough is dry.

2. *Pain* in the larynx, trachea, and large bronchi, which is frequently associated with the severe cough of the phthisical, is also rapidly relieved by inhalations of the spray of pure water. This simple and exceedingly beneficial remedy does not even fail to exhibit its effects when the pain is caused by the presence of tuberculous or catarrhal ulcers in the larynx. In some cases the pain is more rapidly relieved by the addition of a small quantity of some narcotic.

3. *Dyspnœa*. A consumptive suddenly contracted a severe attack of dyspnœa by exposing himself to the cold damp air. By an examination of the chest I ascertained that this depressing symptom was owing to an acute catarrh of the small bronchial tubes. The patient recovered rapidly under the use of atomized muriate of ammonia.

4. *Expectoration.* With the exception of the case just related, in which the object of the local treatment was the solution of the mucus obstructing the tubes, I have heretofore had no opportunity to treat anomalies of the expectoration. But in view of the results obtained by others I would not hesitate in cases of copious and perhaps fetid expectoration, which will in the course of time make its impress on the whole organism of the patient, to employ inhalations of astringents and anti-septic medicines; as, alum, tannin, chloride of iron, tar, creosote, etc.

5. *Hæmoptysis*, which is not rarely a precursor of consumption, and occurs still more frequently in the course of this disease, is the most alarming event for the patient and his friends, and should be treated in the manner suggested under the heading "Hemorrhage from the Air-Passages."

6. *Affections of the larynx and pharynx in the tuberculous.* It would be a great error to consider all severe symptoms of disease of the larynx in the consumptive as the expression of tubercular lesions of the organ of voice. The laryngoscope has taught us that subacute and chronic catarrhs, and even follicular ulcers of the larynx, are not a rare occurrence in the phthisical.

Sometimes also the pharynx of such patients presents all the signs of a chronic catarrhal condi-



tion—congested branching veins, yellow vesicles, and superficial abrasions of the mucous membrane. The patients complain bitterly of a constant disposition to hawk and expectorate, of a sensation of scratching and burning in the throat, and, if the epiglottis is also implicated in the catarrhal inflammation, of the tendency of food and drink to pass the wrong way.

Considering the frequency of these catarrhal affections, I can understand the more or less emphatic recommendation of inhalations of alum, tannin, and nitrate of silver, in the laryngeal diseases of the tuberculous, for I must expressly state that I can not recommend the employment of those remedies in cases of tuberculous deposits in the larynx, having seen no good results either in my own practice or that of others. But inhalations of the spray of simple water always afforded more or less relief to the most troublesome symptoms, even when tuberculous ulcers were present in the larynx.

## HEMORRHAGE FROM THE AIR-PASSAGES.

IF the merits of inhalations in the treatment of the diseases of the air-passages and pharynx thus far noticed had not been sufficiently shown to deserve our undivided attention, the results obtained alone in bleeding from the air-passages would make it the duty of every assiduous practitioner to employ inhalations.

However much authors may differ as to the value of inhalations in other diseases, there exists a general agreement that the new therapeutical measure is not equaled by any other means for the rapid arrest of bleeding from the respiratory tract. Among the many severe cases of hæmoptysis reported in the various journals, there are very few in which the bleeding was not arrested during the first inhalation of an astringent fluid. As far as I have been able to ascertain, Briau alone presents three negative observations; but as an unsuitable remedy (sulphur-water) was selected, and errors committed in the mode of proceeding, our favorable opinion remains unshaken.

If we reflect that frequent relapses are the rule in most cases of hæmoptysis under the best ordi-

nary medication, so that it is considered good policy to prepare the patient for a rapid return of the hemorrhage, every doubt should be relinquished as to the utility of a mode of treatment which affords such prompt and permanent relief.

However, a consideration of another kind was presented, and with seeming propriety. The question arose whether the irritation produced by inhalations, the consequent attacks of cough, and the deep inspirations, would not counterbalance all that was gained. In view of the striking results obtained, such doubts could exist but for a moment. Indeed, a part of the value of the styptic influence of inhalations will perhaps have to be attributed to the deep inspirations. At least I recollect hearing Piorry mention a case of hæmoptysis in a lecture, in which the bleeding could not be arrested until the distinguished clinician directed the patient to inspire deeply.

Among the astringent and styptic remedies which may be employed, chloride of iron occupies the first position. It should not be used in larger quantities than from one to five drops to an ounce of distilled water, as large doses are apt to excite paroxysms of cough; if, however, the hemorrhage is very alarming, larger doses should be resorted to, but the practitioner will have to keep a strict watch over the patient. The addition of the con-

centrated bitter almond water (20 drops to each ounce of water) diminishes the irritating effect of the chloride of iron to a certain extent.

As long as the blood coughed up is fluid, and has a bright-red color, the hæmoptoe is not arrested; the inhalations must therefore be continued until the sputa become more consistent and assume a very dark color.

If the bleeding should cease under the influence of the chloride of iron, but return again and again at short intervals, recourse may be had to alum, the effects of which, according to the experience of Lewin and others, is more permanent.

Dr. Fieber's sensible and humane advice not to refrain from the employment of the chloride of iron on account of the prospective short duration of the life of the patient, may well be adopted, because, as he observes, it is frequently the means of prolonging life, and causing a symptom to disappear, which, more than any other, is calculated to destroy the illusive but consoling hope that renders tolerable the last hours of the poor consumptive.

In the course of the last half year I had an opportunity to test the extraordinary effects of inhalations of chloride of iron in three cases of hæmoptysis occurring in consumptive patients.

Without any premonitory symptoms whatever, bleeding suddenly occurred to such an extent in a

young man thirty years of age that he at once expectorated two pints of blood. During the following night mouthfuls of foamy blood were expectorated whenever he coughed.

Early on the following day I employed the first inhalation of chloride of iron, (three drops to one ounce of water, with twenty drops of concentrated bitter almond water.) The bleeding ceased immediately and did not return again. The patient bore the inhalations well; they were continued in the same doses four weeks longer, when the moist rales formerly present had entirely disappeared. Some dullness under the right clavicle still remains, (after five months.)

The next case was that of a railroad officer, aged twenty-six years, who presented a catarrh at the apices of both lungs. For several weeks the grayish yellow sputa had been tinged with blood. A single inhalation of chloride of iron removed all appearances of blood from the expectoration. After five days a trace again presented itself, but has not returned since, (three months.) The patient inhaled chloride of iron daily for five weeks. His catarrh is greatly relieved, but not entirely removed.

The last case was that of an engineer of an exquisitely tuberculous habit, who presented phenomena similar to those just described. The blood disappeared from the sputa after the first inhalation,

and did not again show itself for the next two weeks, during which time the inhalations were continued. Since then I have lost sight of the patient.

These results show the utter groundlessness of my former apprehensions, that the spray of my apparatus would be less efficient in hemorrhages, on account of its elevated temperature, than the cool atomized fluid of other inhalers. It would seem, on the contrary, peculiarly adapted to the treatment of this phenomenon, as it does not usually excite cough, which is of the first importance in individuals subject to hæmoptysis. If the source of the hemorrhage is very low down in the air-passages, the spray of my apparatus being denser and finer than that of other inhalers, and hence able to penetrate into the finest bronchial tubes, would be more likely to reach the bleeding point.

I have already adverted to the special advantage presented by my inhaler in the treatment of hæmoptysis; namely, that, being kept in continuous action by the steam, it can easily be managed by the patient, to whom every kind of exertion may become a source of danger.

In the case of a schoolmaster who sought my advice about a year ago on account of the presence of streaks of blood in his sputum, and a sensation of a foreign body in his throat, I discovered, by means of the laryngoscope, a bleeding point

about as large as a millet-seed beneath the attached border of the epiglottis. I employed an inhalation of chloride of iron, continuing it for ten minutes. The bleeding has not recurred since. This case is another evidence of the excellent services of the laryngoscope in searching for the source of the hemorrhage.

The importance of this subject will render an apology unnecessary if I briefly allude to the experience of other writers.

Prof. Von Zdekauer, of Petersburg, arrested the bleeding in five cases of hæmoptysis by inhalations of chloride of iron. In the first and fifth cases the bleeding ceased after the first inhalation, in the second case after the fourth inhalation, in the third after the second, and in the fourth after the third inhalation. In three light cases the success was the same.

Dr. Lingen, of Petersburg, had recourse to inhalations of the solution of chloride of iron with complete success in a severe case of hæmoptysis.

Fieber treated three cases of hæmoptoe successfully with inhalations of chloride of iron. In one case he used sulphate of zinc, two scruples to a pint of water. He also recommends cold water.

Schnitzler arrested a hæmoptoe in a consumptive patient with inhalations of alum, five grains to one ounce of water.

In two cases treated by Dr. Leiblinger, the bleeding ceased on the use of inhalations consisting of alum and chloride of iron.

Lewin treated thirty-six cases of hæmoptoe. "In all the usefulness of inhalations was confirmed, the bleeding having ceased either after the first inhalation (twenty-nine cases) or after several (seven cases.) In the majority of these patients the hemorrhage, as far as I could ascertain, did not return. In several individuals the hæmoptoe recurred at stated periods, but ceased each time on the use of inhalations."

Lewin almost always employed the liq. ferri sesquichl.; in several cases he tried alum and tannin. He describes a few cases which he treated at a later period with equal success.

Schlesinger had recourse to chloride of iron and alum in four cases of hæmoptysis. Both remedies proved highly successful. According to his opinion, the effects of alum are more permanent than those of chloride of iron.

Tobold treated twenty-one cases of hæmoptoe. The bleeding was arrested by from one to three inhalations of alum.

Wedemann made use of tannin and chloride of iron in six cases.

Hillairët had charge of a patient with an offensive bronchial secretion who was subject to frequent



attacks of protracted hemorrhage, which were arrested and recurred less and less frequently under the use of chloride of iron.

Waldenburg had the opportunity of treating six cases of severe and long-continued hæmoptoe. In two cases chloride of iron was inhaled; in the others alum. In all the bleeding ceased immediately after the first inhalation. Only in the first case the hemorrhage continued for several hours after the inhalation, but much diminished in quantity.

Having arrived at the close of my work, I desire briefly to call attention to some of the uses of atomized medicated fluids in the local treatment of diseases of the eye. I had an opportunity of informing myself as to this new application of inhalations in the clinic of Dr. Wecker, of Paris.

Leiblinger narrates the following interesting experience: "In excoriations of the cutis of the lids from acrid secretions excellent results were obtained from an atomized collyrium of sulphate of zinc.

Recent ulcers of the cornea may be healed rapidly by the employment of distilled water with Sydenham's laudanum, if the stage of excitement has been overcome by proper treatment. While treating ulcers with inhalations, I made the inter-

esting observation that the anterior ciliary vessels become strongly injected, thus conveying an increased amount of blood to the ulcer of the cornea. This congestion continues about an hour, when it disappears entirely; the ulcer becomes clean, and the regeneration of the epithelium takes place sooner than if the laudanum had been dropped into the eye—(I speak of superficial ulcers.) The latter method is also attended by severe pain, whereas the patient is able to keep open his eyes during the application of the medicated spray without experiencing any uneasiness.

The atomized fluid having rendered essential services in ulcers of the cornea, it did not forsake me in pannus the result of trachoma. In the case of a patient who was subject to trachoma, that is, to a perfect trachoma, as described by Arlt, combined with trichiasis, entropium, and pannus, and whose ciliæ I had extracted every four weeks, I had applied the sulphate of copper in substance for a whole year, and as this, with all the other means used, had failed to give relief, I tried the spray of a collyrium consisting of six ounces of distilled water, one scruple of sulphate of copper, and one drachm of tinct. of opium. After having employed the spray ten times, the cornea became clear, so that the patient could not only read large letters, but could also clearly distinguish the hands of a watch."

I recollect several patients who inhaled astringent fluids for other diseases, and in whom chronic conjunctival catarrh, with which they were incidentally affected, healed in a remarkably short time.

It might, at first sight, seem paradoxical to claim an advantage for the application of atomized fluids to an organ like the eye, which would appear more accessible to more direct methods of local medication. However, facts and further reflection will remove every doubt. Inasmuch as atomized fluids have the power of acting continuously, in a form easily absorbed, and in their entirety, on the affected organ, whether it be the eye, the pharynx, or any part of the air-passages, they are far superior to every other local therapeutical measure.



## SUMMARY

OF THE MEDICINES MORE FREQUENTLY EMPLOYED FOR  
INHALATIONS.

**A**BOUT an ounce of medicated fluid is atomized by my apparatus in a quarter of an hour. Nearly an equal amount of fluid (six drachms) escapes from the boiler as steam in the same time. The medicated fluid must therefore be made twice as strong as for other inhalers. The

following doses are calculated for my apparatus, and for one ounce of distilled water.

#### 1. AQUA.

1. *Cold*—This was first recommended by Dr. Fieber in cases of hemorrhage from the organs of respiration, at a temperature of 50°–55° Fahr.

2. *Warm*—A remedy long known for promoting secretion, rendering it more fluid, and detaching it from the mucous membrane of the air-passages. Particularly effective in angina and croup of the larynx. In ulcerative processes it acts as a detergent and sedative.

#### 2. LIQUOR FERRI SESQUICHLORIDI.

*Dose*—From 2 to 20 minims.

*Diseases*—Bleeding from air-passages; catarrh of the same, particularly in the anæmic; excessive secretion in which it also acts as an antiseptic. Whooping-cough. According to Lewin, it is contraindicated in the delicate susceptible constitution of that class of consumptive women whose mucous membranes are highly irritable. The teeth, particularly when carious, are easily blackened by chloride of iron. The solution should be kept in the dark, as the action of light causes a precipitate.

Precipitates of iron in the glass tube of the inhaler can be removed by sulphuric acid.

## 3. ARGENTI NITRAS.

*Dose*—From 1 to 10 grains.

*Diseases*—Inflammatory, and, especially, ulcerative processes of the pharynx and larynx. Pharyngitis granulosa. The inspirations should be shallow.

The solution must not be exposed to the influence of the light; but as it is also decomposed in the dark, it should always be filtered before use. Spots on the hands or clothes can be removed by means of a concentrated solution of iodide of potassium, or by the (poisonous) solution of cyanide of potassium.

Whilst inhaling the patient may protect his face from the blackening effect of the nitrate of silver, either by applying some unctuous substance to the face, or by wearing a mask.

I direct my patients to hold a funnel-shaped contrivance, made out of pasteboard, before the face. This answers the purpose very well.

## 4. ALUMEN.

*Dose*—5 to 30 grains.

*Diseases*—Inflammations, particularly catarrhal, of the pharynx and air-passages. Excessive secretion. In hemorrhages, when required to act more permanently than chloride of iron.

## 5. ACIDUM TANNICUM.

*Dose*—1 to 20 grains.

*Diseases*—The same as alum. Particularly in laryngeal croup and œdema of the glottis. It acts also as an antiseptic.

The solution can not be kept long, as flocculi probably of gallic acid soon make their appearance.

## 6. ZINCI SULPHAS.

*Dose*—5 to 20 grains.

*Diseases*—Excessive secretion. As an eye-douche in excoriated lids.

## 7. EXTRACTUM KRAMERIÆ.

Successfully used in chronic inflammation of the air-passages by Bataille in his own person.

## 8. TINCTURA IODINII.

*Dose*—1 to 20 minims.

*Diseases*—Granular inflammation of the pharynx. Pharyngitis sicca and all those diseases of the pharynx, in which the glands are pathologically affected. Also chronic enlargements and swellings of the larynx. (Lewin.)

## 9. POTASSII IODIDUM.

*Dose*—2 to 20 grains.

*Diseases*—The same as tinct. iodinii, but seems to be less active.

## 10. POTASSII BROMIDUM.

*Dose*—1 to 10 grains.

*Diseases*—Laryngeal croup. (Schnitzler.)

## 11. POTASSÆ CHLORAS.

In diphtheria and aphthæ of children.

## 12. LIQUOR POTASSÆ ARSENITIS.

*Dose*—1 to 20 drops.

*Diseases*—Asthma nervosum.

## 13. HYDRARGI CHLORIDUM CORROSIVUM.

*Dose*— $\frac{1}{2}$  to 2 grains.

*Diseases*—Syphilitic affections of the pharynx and larynx.

## 14. SODII CHLORIDUM.

*Dose*—5 grains to 4 drachms.

*Diseases*—Acts as expectorant in catarrhal conditions of air-passages, and in phthisis pulmonalis.

## 15. AMMONIÆ HYDROCHLORAS.

*Dose*—10 grains to 2 drachms.

*Diseases*—Recent laryngeal and bronchial catarrhs, in which it is a very useful expectorant.

## 16. POTASSÆ CARBONAS.

*Dose* and *diseases* same as muriate of ammonia, besides a certain form of follicular pharyngitis.

## 17. AQUA PICIS.

*Dose*—1 to 10 minims.

*Diseases*—Excessive and offensive secretions, dilatation of the bronchial tubes; gangrene of the lungs; tuberculosis; emphysema. Preeminently as an antiseptic.

## 18. OLEUM TEREBINTHINÆ.

*Dose*—1 to 2 drops.

*Diseases*—Same as tar-water.

## 19. OLEUM CADINUM.

*Dose*—2 to 4 drops.

*Diseases*—Emphysema. (Leiblinger.)

## 20. AQ. AMYGD. AM. CONC.

*Dose*—10 to 20 minims.

*Diseases*—As a sedative in painful affections of larynx and air-passages. In excessive inclination to cough. A favorite addition to chloride of iron and other acrid and irritating medicines.

## 21. MORPHIÆ ACETAS.

*Dose*— $\frac{1}{8}$  to  $\frac{1}{2}$  grain.

*Diseases*—Same as concentrated bitter almond water.

## 22. TINCTURA OPII.

*Dose*—1 to 3 minims.

*Diseases*—Same as bitter almond water.



Fieber once employed 12 drops without any signs of excessive action.

23. EXTR. ALC. HYOSCIAMI.

*Dose*— $\frac{1}{4}$  to 2 grains.

*Diseases*—Very successfully employed by Fieber in whooping-cough, intense bronchitis, and bronchial catarrh, with spasmodic phenomena.

24. EXTR. CANNABIS INDICÆ.

In the painful cough of phthisis pulmonalis. (Leiblinger.)

25. EXTR. CONII MACULATI.

*Dose*—1 to 6 grains.

*Diseases*—Constant sensation of irritation in larynx. (Lewin.)

26. BELLADONNA.

In the nocturnal irritative cough of children.

27. ATROPIÆ SULPHAS.

*Dose*— $\frac{1}{2}$  grain to 20 ounces of water.

According to Fieber useless and dangerous, on account of bad preparation.

28. QUININÆ SULPHAS.

*Dose*— $\frac{1}{2}$  grain to 20 ounces of water.

Was employed by Dr. Fieber in typical paroxysms of cough, but produced congestion of lungs and bloody sputa.

## 29. GLYCERINA.

Employed by Demarquay with tannin. One part tannin, 50 parts glycerin, 100 parts water. According to my experience, is not well borne.

## 30. OLEUM OLIVÆ.

In the form of "mixtura oleosa" in dry coughs and whooping-cough. (Fieber. Leiblinger.)

## 31. MINERAL WATERS.

*Sulphurous Water*—In hoarseness; pain in the throat; pharyngitis granulosa; tuberculosis. Much used by the French.

## APPENDIX.

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### NASAL DOUCHE, OR APPARATUS FOR TREATING DISEASES OF THE NASAL CAVITY.

PROF. WEBER, of Halle, made the discovery that when one side of the nasal cavity is completely filled with fluid by hydrostatic pressure, the fluid will pass round and over the posterior edge of the septum narium, and sometimes also through the frontal sinuses into the opposite side of the cavity, and escape by the corresponding nostril. Fluids may thus be brought into contact with every portion of the lining membrane of one-half of the nasal cavity, and a considerable part of the other half. Prof. Thudichum has applied this principle to the treatment of the diseases of the nasal cavity. By the employment of a very simple contrivance, called the nasal douche, he has succeeded in applying to the entire surface of the nasal cavity such medicated fluids as are indicated for the removal of the various pathological conditions incident to the Schneiderian membrane. He says, "that by means of the application of this principle to the treatment of diseases of the nose, it is possible easily and frequently to wash the nasal cavity, to disinfect and deodorize

it, to remove the sordes which accumulate so easily in it, and to apply to its surface a great number of beneficial medicinal substances, so as to prevent acute affections from extending, and to incline them toward a speedy recovery—to stop hemorrhages, allay irritations, and subdue, in a remarkable manner, chronic affections of the Schneiderian membrane, so as to reëstablish a perfectly healthy surface and normal condition of the organ of smell.”

The apparatus employed for these purposes is extremely simple. It consists of a reservoir or glass bottle, of the capacity of one or two pints; an india-rubber tube, one extremity of which is attached to an opening near the bottom of the reservoir, the other being free; a nozzle covering the free extremity of the tube, and made of various sizes, so as to fit the nostril accurately, and prevent the medicated fluid employed from passing outward or air from entering the nostril.

#### MODE OF APPLYING MEDICATED FLUIDS TO THE NOSE.

The reservoir or bottle is elevated a little higher than the head, and filled with a suitable medicated fluid of a proper temperature. By depressing the nozzle, the air in the india-rubber tube is displaced by the fluid, the escape of which, after it has completely filled the tube, is prevented by grasping the tube near the nozzle between the thumb and index finger. A small quantity of the fluid should be permitted to escape, so as to be sure that no air is contained in the tube. The nozzle is then gently pressed into the

nostril, and the grasp relaxed, when the medicated fluid will enter and completely fill the whole nasal cavity and escape by the opposite open nostril. The head should be thrown slightly forward over a basin, and the breathing is to be performed through the mouth, which must be held open.

When there is reason to suppose that there are sordes or crusts of dried matter in the nose, it will be proper to let the fluid pass—at first under slight pressure, but when these have been loosened and dissolved, the reservoir should be raised to a considerable height in order to wash away the impurities by a rapid current. Sometimes it is necessary to reverse the stream before the sordes are fully detached. The current may generally be reversed in all cases of diseases with much benefit.

#### THE MEDICATED FLUIDS WHICH MAY BE APPLIED TO THE NOSE.

The Schneiderian lining of the nasal cavity is less sensitive than the conjunctiva, but slightly more so than the buccal mucous membrane. At first it will be well to make use of simple fluids to accustom the mucous membrane to the applications. Pure warm water may be resorted to, but in most persons it excites a very disagreeable sensation, and gives rise to sneezing and a very copious discharge of watery mucus. These symptoms are less apt to follow the use of milk and water, or solutions of common salt. The solution of common salt may contain one ounce to a pint of tepid water;

some individuals do not bear so much salt, others tolerate a more concentrated solution.

In order to produce an astringent effect in cases of chronic inflammation or superficial abrasion of the mucous membrane, we may employ the ordinary astringents; as, alum, sulphate of zinc, sulphate of copper, and nitrate of silver. Half an ounce of alum, dissolved in a quart of tepid water, would be a suitable strength for cases of superficial ulceration and blenorrhagic conditions. Of sulphate of zinc and sulphate of copper, from a scruple to a drachm may be added to a quart of warm water. Solutions of nitrate of silver should not contain more than from sixteen to thirty-two grains to a quart.

In order to avoid the disagreeable symptoms mentioned above, it will be found advantageous to add salines to the astringent solutions; thus, from half an ounce to an ounce of sulphate of soda or magnesia to the solution of sulphate of zinc or sulphate of copper, and from half an ounce to an ounce of nitrate of soda to the solution of nitrate of silver. If the nitrate of soda is not at hand, the amount of the nitrate of silver added to a quart of warm water should not exceed from twelve to twenty-four grains.

As an alterative the bichloride of mercury is the most suitable remedy. Much care is necessary in the employment of this medicine, as it may irritate and even produce excoriations of the healthy surface, if used too strong. At first not more than five grains should be added to a quart of warm water, in which

an ounce of chloride of sodium has been previously dissolved.

To deodorize the nasal cavity, solutions of permanganate of potassa have been employed. The strength of the solution may vary from one to ten grains in a pint of water, according to the severity of the case.

When it is necessary to allay pain and combat symptoms of irritation, we may have recourse to hydrocyanic acid, forty minims to a quart of tepid water. Or, instead of this, two drachms of tincture of opium may be added to a quart of water. Morphia may be substituted for the tincture of opium, when it is necessary to combine the sedative with other medicated solutions. Hydrocyanic acid is incompatible with the copper and silver, but may be added to the solutions of alum and common salt.

To produce a hæmostatic impression in cases of epistaxis, very cold water or ice-water containing an ounce of table salt to each pint, is superior to all other solutions, according to Prof. Thudichum. Should it be found insufficient to arrest the bleeding, an ounce of tincture of sesquichloride of iron may be mixed with each pint.

## TO THE PATRONS

WHO have so kindly assisted me in carrying on my business for thirty years, I owe many thanks, and respectfully solicit a continuance of their favors.

It will be my object, as hitherto, to keep on hand a full assortment of surgical instruments and to pay special attention to the latest improvements and inventions in this department.

Having facilities for coöperating with the best medical men of this city, I am enabled to fill any order for orthopædical instruments; as, for Bow-Legs, Club-Foot, Cross-Legs (X), Sayer's & Davis's Hip-Joint Apparatus, Spinal and Shoulder Braces of any size or pattern, Wire Gauze Splints for Fractures of any nature. The manufacture of these apparatuses will receive my full attention.

I take pleasure in giving (page 2) a brief description of certain new instruments for inhaling medicated vapors and sprays in the treatment of various diseases of the Lungs, Throat, Larynx, Trachea, and Bronchi.

**MAX WOCHER,**

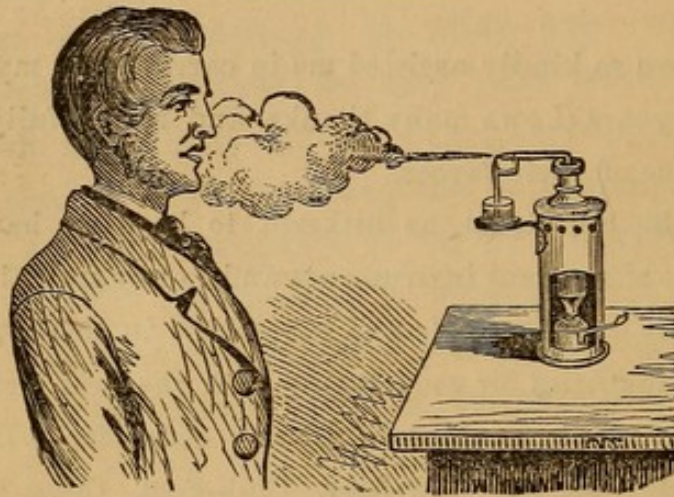
*No. 105 West Sixth-St., Cincinnati, O.,*

**IMPORTER AND MANUFACTURER OF SURGICAL INSTRUMENTS.**



# NEW INSTRUMENTS

For Inhaling Medicated Vapors and Sprays.



*Fig. 1.*

FIG. 1 represents Dr. Siegle's *Improved Steam Apparatus* for pulverizing or atomizing medicines for the treatment of the diseases of the air-passages, paralytic affections of the eye, and lesions of the outer passage of the ear.

## DIRECTIONS.

Fill the brass flask with one ounce of soft water, close it with the screw into which the glass tube has been inserted, and put it into the tin stand. Place the glass cup on the ring, fill it with the required medicine, and insert the glass tube into it. Fill the lamp two-thirds with alcohol, and have the wick tight in the tube. Light the lamp, put it into the tin stand, and steam will be generated in a few minutes.

Fig. 2 represents Dr. Siegle's *Steam Apparatus*, improved by Messrs. CODMAN & SHURTLEFF, Boston, and is for sale by **Max Woher**, CINCINNATI, O.

## DIRECTIONS.

This apparatus consists of a boiler and lamp for generating steam. J. J. Lamp, provided with tube for graduating flame. K. Safety valve for high or low pressure. By unscrewing the valve tube, the boiler may be filled with water without disturbing the atomizing tubes. L. Milled button or top. Between this and a suitable projection or shelf within the neck of the boiler, is secured the packing of rubber through which the atomizing tube passes, air and steam tight. M. Mahogany ring, to protect the hand from heat in removing the boiler and tubes for the purpose of changing the medicine. N. The atomizing tubes. O. Cup in which the medicine is placed. P. Shield for protecting the patient's face from unpleasant contact with the medicated vapor. Q. Joint allowing the shield to be moved to, and retained at, any necessary deviation from a horizontal position. R. Sliding staff, regulating the height of the shield. By means of the joint and the sliding staff, the shield may be

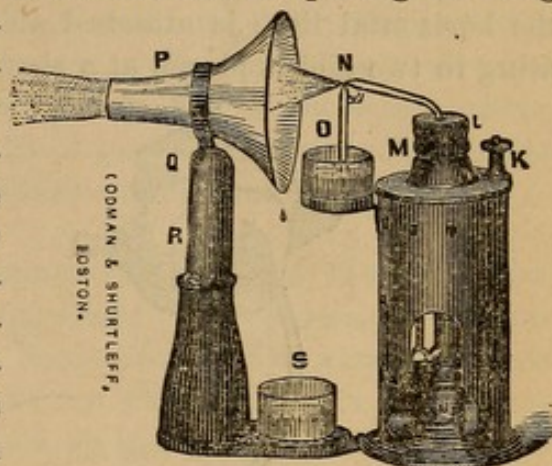


Fig. 2.

adjusted for use by adults or by children.

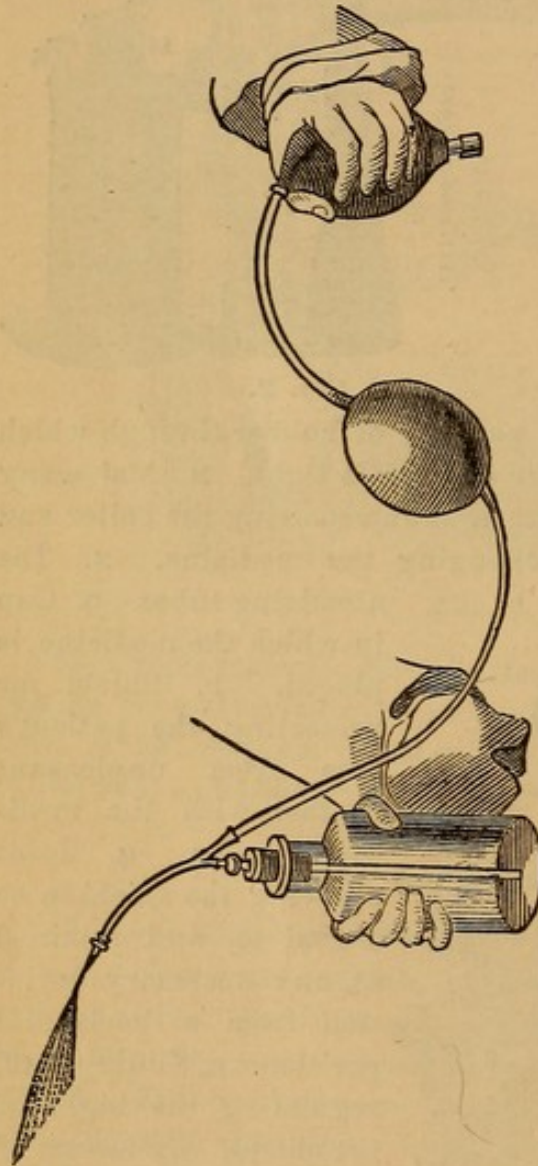


Fig. 3.

adjusted for use by adults or by children.

Fig. 3 represents the *Apparatus* of Dr. ANDREW CLARK, of London, *for producing Spray*, and is recommended

by him as next to Dr. Siegle's. It consists of an ounce bottle for holding the fluid to be atomized. Through the cork stopper of this passes the perpendicular limb of a Bergson's tube; to the horizontal limb is attached an india-rubber tube, terminating in two globes placed at a short distance from each other.



*Fig. 4.*

Otherwise this apparatus is like Dr. Clark's.

The one covered with network is the air reservoir, the other the air-pump. By alternately compressing and relaxing the end ball, the air reservoir is distended as far as the network will permit, and a continuous spray produced, so fine that the most sensitive eye may be bathed, even when left open. The apparatus may also be used for applying lotions to painful sores.

The apparatus of Dr. MAUNDERS, of London, for applying spray to the larynx, has two long glass tubes attached to each other by rubber tubing, and long enough to reach to the larynx. The points of the tubes are bent downward, so that the spray can be directed into the larynx; another set of tubes are bent upward to reach the posterior nasal openings.

Fig. 4 is the *Apparatus* of Dr. RICHARDSON, of London, for producing *Local Anæsthesia* for minor opera-

tions, and extracting teeth. It consists of four different jets or tubes; one straight for general use, such as opening abscess, operating on imbedded toe-nail; one double for dentistry; one curved for cavities; and one large for arresting hemorrhage, with three regulating pins of different sizes, to regulate the amount of spray. It has a two-ounce bottle, graduated and furnished with a ground stopper. The rubber bulbs are like those of Dr. Clark's apparatus.

Fig. 5 represents Dr. THUDICHUM'S *Nasal Douche for the Treatment of Catarrhal Affections*. A. Reservoir.

B. Leading tube. C. Nozzle, fitting the nostril in such a manner that the liquid can not pass outward, nor air enter the nostril. D. Joint, formed by inserting a short glass tube

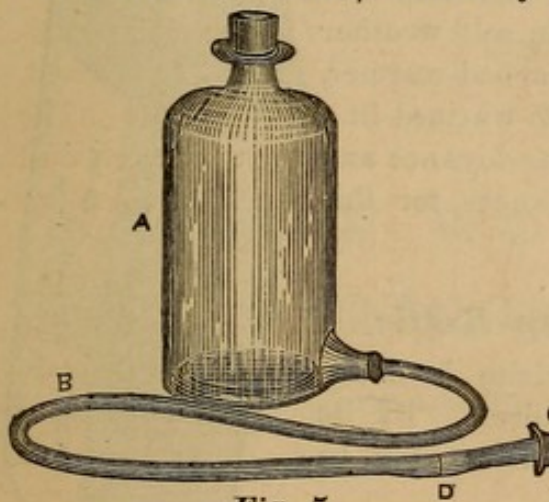


Fig. 5.

into the rubber tubing, to which nozzles of different sizes or for different patients, may be attached without loss of time.

#### DIRECTIONS.

In using the douche, the reservoir is placed higher than the head, and the rubber tube is grasped near the nozzle, between the thumb and finger, so as to control the current. The nozzle is then depressed enough to allow a little of the liquid to escape, thereby expelling air from the tube. It is then gently pressed into the nostril, and the grasp gradually relaxed, when the current will enter and fill the whole cavity of the nose, and escape by the opposite nostril, the head being slightly thrown forward over a basin, and the mouth kept open.

Fig. 6 is RONCHETTI'S *Portable Hot-Air Bath*, to be used in cases of cholera, paralysis, rheumatism, Bright's disease of the kidney, colds, chills, etc.

This apparatus is designed to give a patient a hot bath in

bed. It is so compact in form that it can be carried in the hand. The heat is produced by a small alcohol lamp placed in the lower part of the apparatus. The cost of a bath will not exceed five cents. It is an *important requisite in every house, and no family should be without it.* In many cases of sickness the immediate use of the hot bath is necessary, but in consequence of the difficulties attending it, an invalid rarely receives its benefits without the risk of taking cold. With this Portable Bath all difficulty and danger is avoided. The patient is placed in bed,

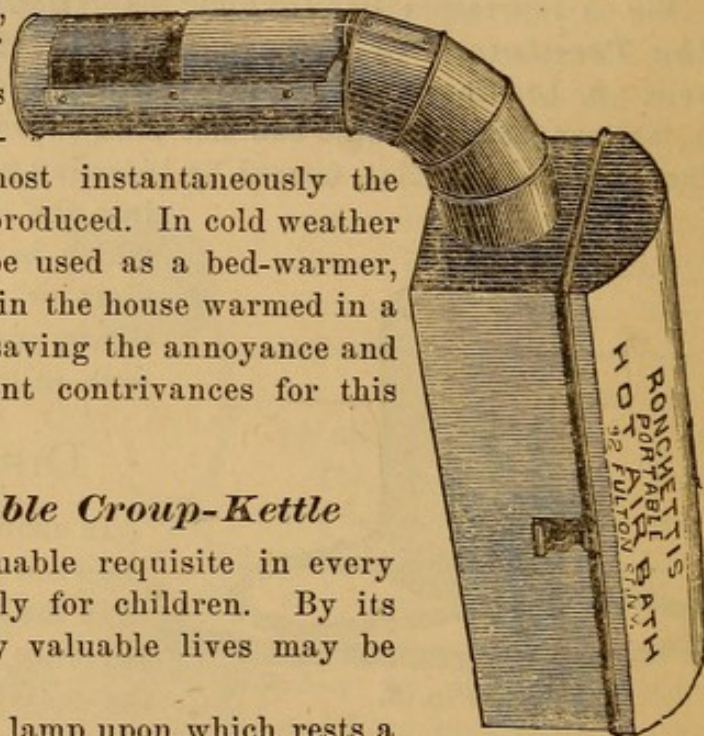
the upper part of the apparatus is put under the bed-clothes, and almost instantaneously the desired effect is produced. In cold weather it can likewise be used as a bed-warmer, and all the beds in the house warmed in a short time, thus saving the annoyance and trouble of present contrivances for this purpose.

### *The Portable Croup-Kettle*

Is also an invaluable requisite in every house, particularly for children. By its timely use many valuable lives may be saved.

It consists of a lamp upon which rests a kettle, with all the facilities to generate and inhale the vapor. It has an extra gas-burner, which can be used with the Croup-Kettle or Bumstead's Fumigating Lamp, by connecting it with the gas-pipe by means of flexible tubing. As sometimes the Croup-Kettle is used a day or two, and the water kept boiling all the time, gas will be cheaper than alcohol.

With the arrangements made with Mr. DAY, as sole agent here of his *Improved Splints*, I can sell them either in sets or separate, at reduced prices.



*Fig. 6.*

A large assortment will be kept constantly on hand of *Amputating, Trepanning, General Operating, Resection, Auscultating, Obstetrical, various Pocket, Medicine, Eye, and Dental Cases; Saddle-Bags and Buggy Cases; Amesbury's Leg Splints; Elastic Urinal Receivers; Speaking Trumpets; Pessaries; Trusses of all kinds, Abdominal Bandages and Supporters, Abdominal Rubber Belts; Rubber Stockings, Knee-Caps and Ankle-Pieces; Laryngoscopes; Liebreich's, Graefe's, and Soleil's Ophthalmoscopes; Binocular Ophthalmoscope; Camman's & Lawson's Stethoscopes; Fever Thermometers in Cases; Vaccinators; Suspensory Bandages; Hypodermic Syringes; Cupping Instruments; Veterinary Instruments; Tangle Tents, Sponge Tents; Bougies and Catheters, silver-plated and flexible; Electro-Magnetic Machines; Stomach Pumps; etc., etc.*

ANY ORDERS WILL BE PROMPTLY FILLED.

OLD INSTRUMENTS REDRESSED.

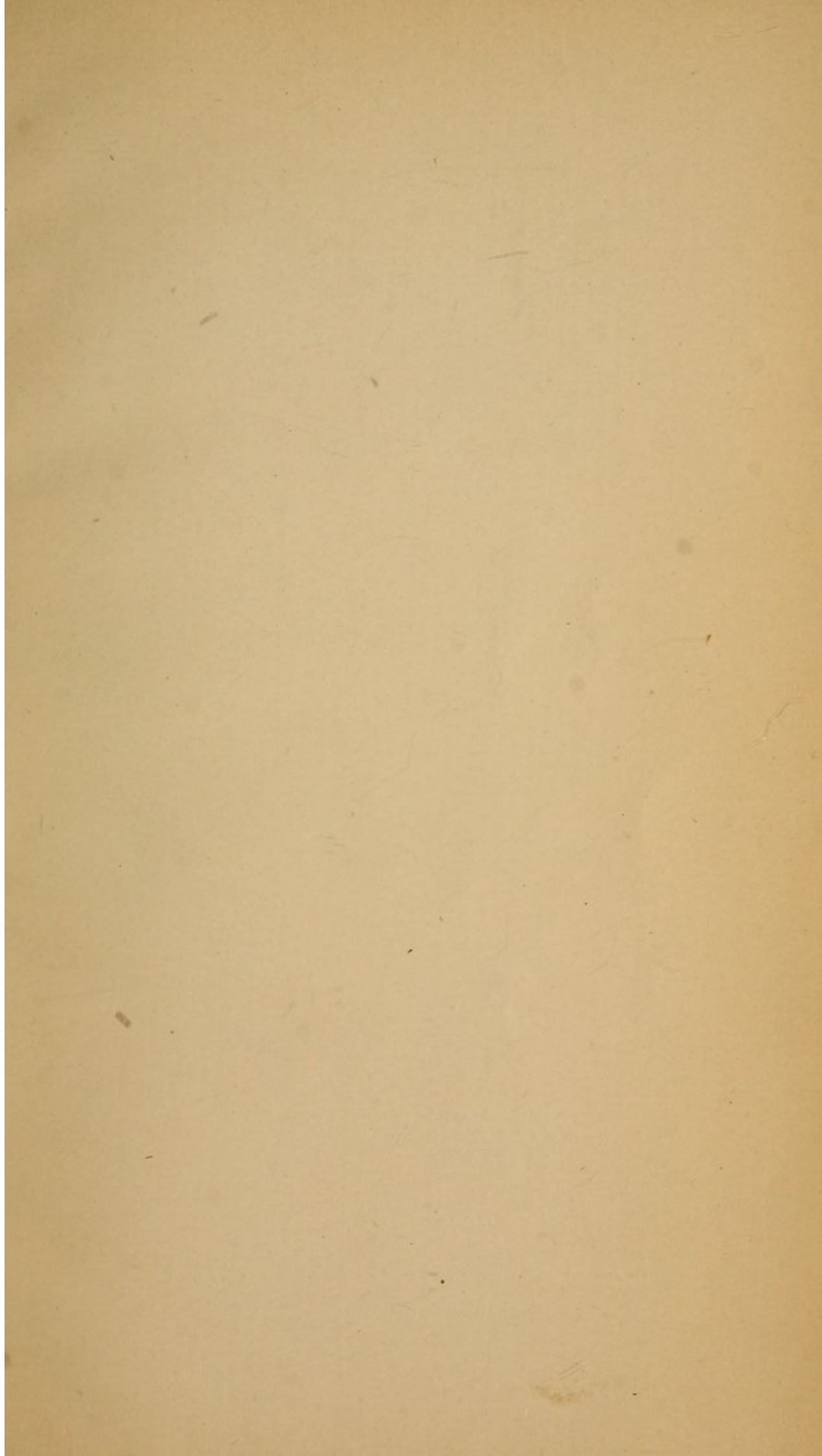
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MAX WOCHER,  
SURGICAL & DENTAL INSTRUMENT MAKER,

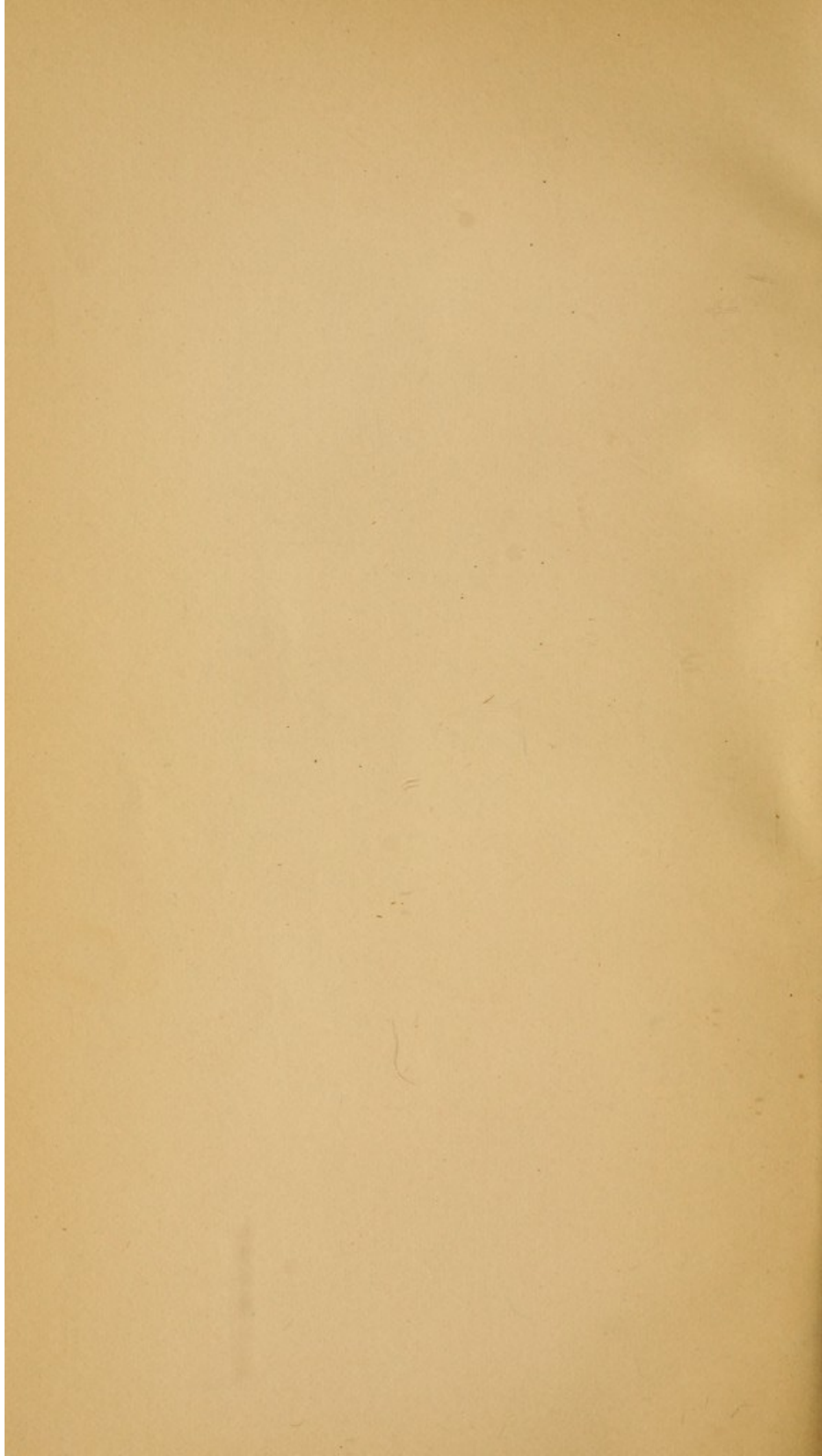
105 WEST SIXTH-STREET, CINCINNATI, OHIO.

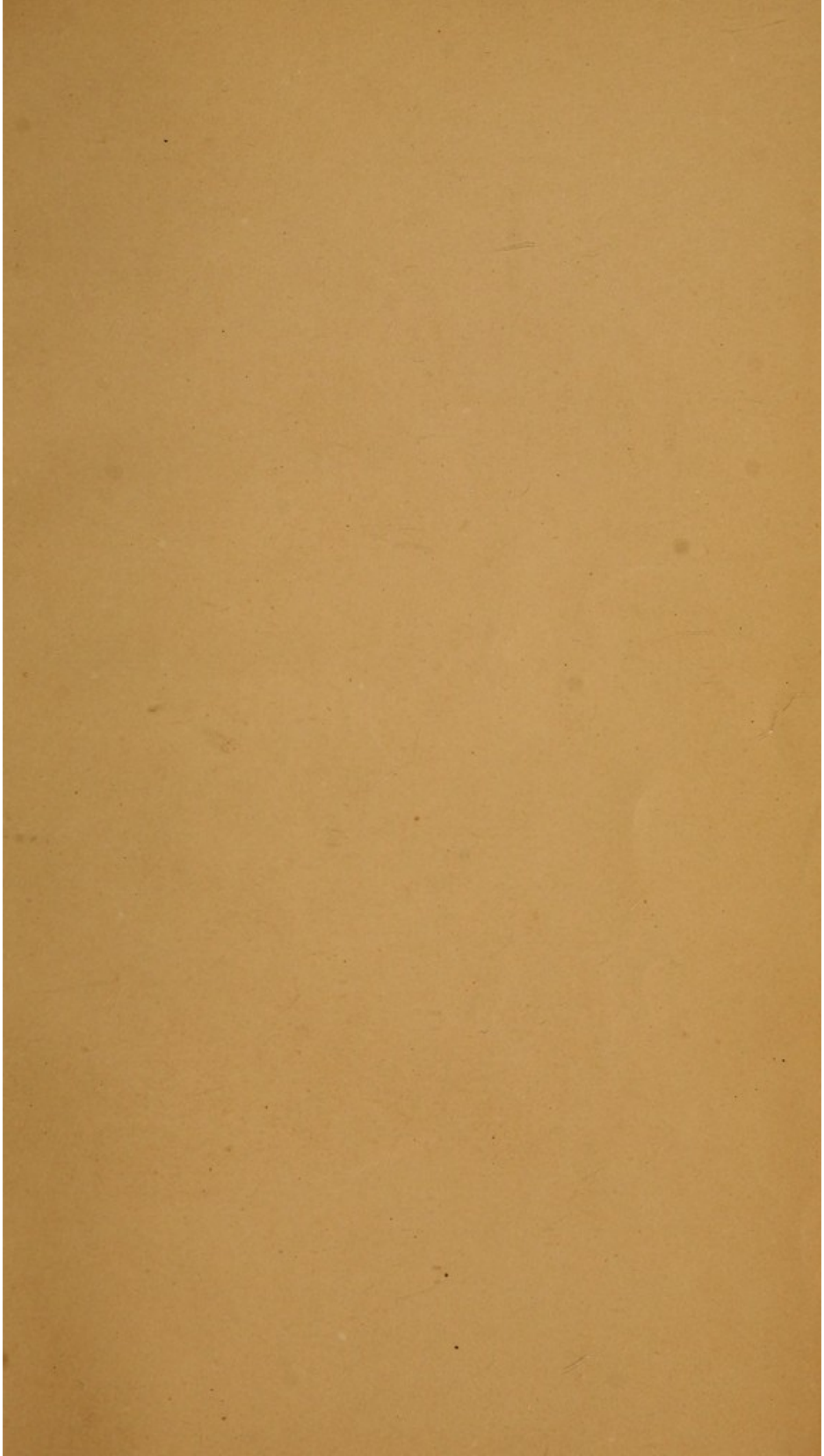
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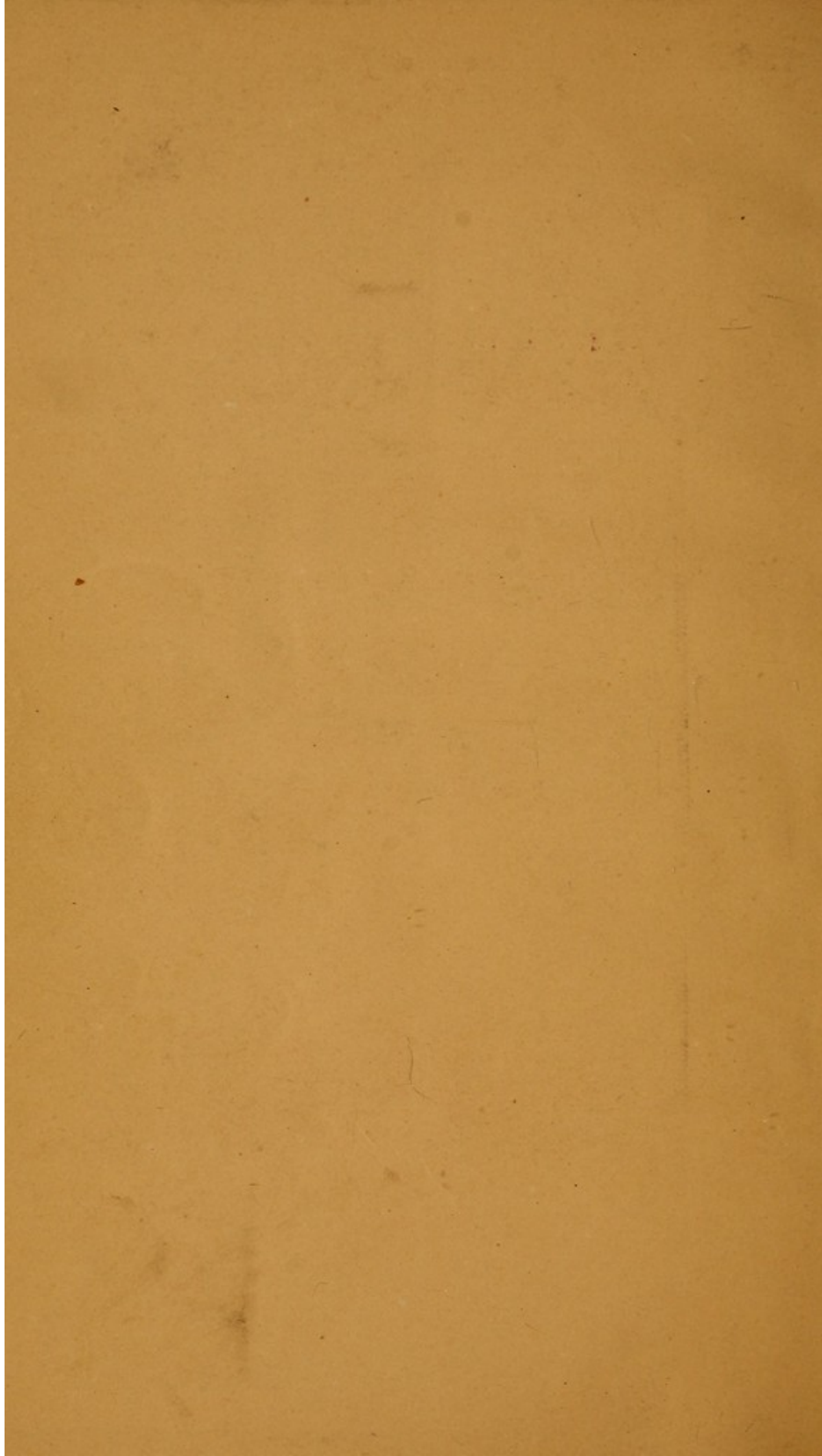
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