Laryngoscopal medication : or, the local treatment of the diseases of the throat, larynx, and neighboring organs, under sight / by Louis Elsberg, A.M.

LARYNGOSCOPAL MEDICATION;

OR, THE

LOCAL TREATMENT OF THE DISEASES

OF THE

THROAT, LARYNX, AND NEIGHBORING ORGANS,

UNDER SIGHT.

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With Seven Woodcuts representing the various Instruments employed.

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PREFACE.

"Qui sufficit ad cognoscendum, sufficit quoque ad curandum."—HIPPOCRATES.

THE laryngoscope has completely changed our notions as to the diseases of the larynx and their treatment. Laryngoscopal medication has been, with authority, pronounced "the most important improvement recently made in Practical Medicine." And I present the following essay to the profession at large, with the earnest desire that the mode of local treatment here explained, shall become incorporated with the daily practice of the physician in every case requiring it. I will at least have done my part toward bringing about this consummation devoutly wished for. In how far the object will be accomplished, time will show.

ELSBERG.

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LARYNGOSCOPAL MEDICATION.

Section 1.

The introduction of laryngoscopy, *i. e.* the method of inspecting, by means of a mirror held in the mouth, the larynx and neighboring structures, marks an important era. In rendering accessible to our view, in living working order, organs thus before veiled from mortal eyes, it has not inconsiderably advanced the cause of human investigation. The satisfaction it grants to the inquirer in the fields of general science, of physiology, and of vocal music, is intense. As an aid in diagnosis to the physician, it can truly be said to have revolutionized laryngeal bio-pathology; and, by directly enlarging the field of therapeutics, it has bestowed upon suffering humanity another and still greater boon.

The practical advantages of the laryngoscope in medicine were long limited mainly to the recognition of disease;—indirectly, it had thus very frequently contributed to the cure. Its capabilities in regard to the latter, with "the intelligent eye guiding and controlling the operating hand," had been early pointed out by Czermak,—but the special instrumental appliances and technical procedures for directly carrying on treatment by its aid remained very imperfect. The ingenious attempts made, and satisfactory results attained, sufficed to show "*how much can be achieved*," rather than succeeded in giving to laryngoscopal therapy any rank in the healing art. To speak especially of this country, while there were many who began to use the laryngoscope for diagnostic purposes, I was here the first, and as far as I know, still am the only one who has devised instruments for directly medicating the interior of the larynx, both the organ and the instrument being visible to

the operator by means of the mirror. And as I deem it of the utmost importance to call the attention of the profession to the accurately local and effective medication that is thus possible, I republish in the present essay the description and manner of employment of the instruments with which it is accomplished. I begin with my spatula.

Section 2.—*Description of a New Spatula for Examinations and Operations in the Cavity of the Mouth.*

The tongue spatula is one of the unfortunate surgical instruments which almost everybody who has used them to any great extent, has found fault with, and modified. Without an attempt at exhaustive research, I have gained from various sources information of over fifty different kinds; and of the majority of these I can truly say that an ordinary spoon-handle serves the purpose just as well, if not better. Not going further back than to within the last twenty years, I have found that the publication of Green's "Treatise on the Diseases of the Air Passages," in 1846, in which it was claimed that a sponge-armed probang could be thrust at will into the interior of the living larynx, gave quite an impulse to the endeavors to construct a suitable instrument with which the tongue might be so much depressed, and at the same time drawn forward, as *to reveal the upper edge of the epiglottis.* Before the impetus thus given had subsided, the introduction of the laryngoscope by Czermak, in 1858, offered another and still stronger inducement to devise a proper tongue spatula. The names that have been applied to it have varied, according to the modesty or fancy of the inventor or modifier, from the dignified and much promising one, "speculum," or even "laryngoscope," to the simple but truthful one, "depressor." To render an account of all the various kinds proposed, would be a difficult and unprofitable, even were it a possible, task.

It is desirable to have some means of assisting the patient in keeping his mouth open; 2, to hollow out the oral cavity posteriorly, and press the tongue forward and upon the very floor of the mouth, without depressing its attachments with the larynx; 3, to have the blade for the tongue adjustable at differ-

ent lengths; 4, to have some arrangement attached to hold the mirror in operations in the interior of the larynx, or the palate-hook in rhinoscopic investigations, etc. On the other hand, it is undesirable to force or keep the patient's mouth open by main strength; 2, either to let the tongue slip over on the sides of the instrument, or rise back, and thus obscure vision and interfere with instruments in operations on the tonsils, uvula, in the pharyngo-nasal space or larynx,—or to pull on, constrain, or press upon it, so as to give the patient pain; and finally, it is undesirable to have the apparatus a complicated one.

A tongue spatula with all the good qualities to be found in others, and possessing the desirable features, without the objectionable ones just mentioned, is certainly a great desideratum. The instrument which I am about to describe I believe to supply such a want.

A somewhat ladle-handle-shaped curved metallic blade, six and a half inches long, on its lower surface a little hollowed out laterally and roughened—with a handle of three and a half inches, partly of metal and partly of hard rubber, attached at right angles, constitutes the tongue-piece. Two inches from the rounded free end of the blade an opening commences which is three inches long, and in which easily slides a button carrying a strip of metal, which plays flat upon the blade, and may also in any position be raised to an angle of at least 45°. Two upright-bent wires, constituting the mouth-keeper, covered above with india-rubber tubing, are firmly attached to the nearer end of this metallic strip, at an angle of about 130°, so that, on elevating the further extremity, the wires lie flat upon the blade, and vice versa; to this extremity there is fastened either a band of india-rubber webbing, or a spiral spring. If the webbing is to be used exclusively, nothing but two or three strong pins, inclined downwards, projecting from the junction of the tongue-blade and handle, is needed to fasten it; while a longitudinal opening, commencing at this junction and communicating with the anterior opening, and hooks projecting from the inner side of the handle, or screws, are used to secure the spiral spring. I have had instruments with both arrangements constructed, but on account of its simplicity prefer that with the webbing. Attached to one of the upright wires is a

little fork (of which a glance at the figure gives a better idea than verbal description might convey) intended to hold between its fangs the handle of a mirror, hook, or any other instrument desired to retain in the oral cavity.*

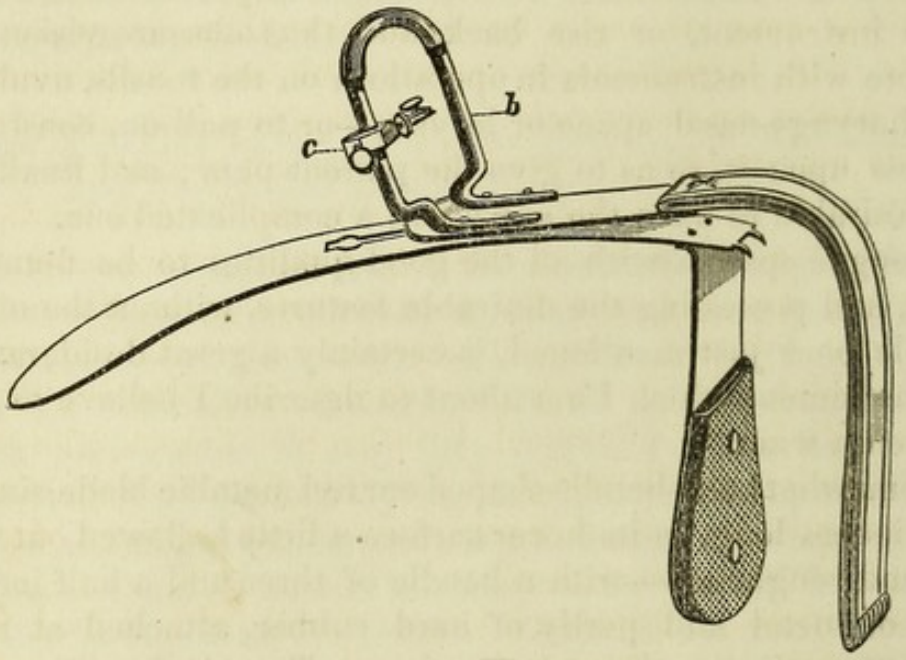

Fig. 1.

This instrument, in the first place, is very simple in its construction; and the manner of its use is obvious on inspection. Next it must be observed that the blade for the tongue can be lengthened and shortened; its shape is that proposed by Czermak, which experience has shown to be best suited for its purpose; and sufficient power can be exerted with it to smoothe down muscles rebelliously inclined. Then, the mouthkeeper does not, in spite of the patient, force the mouth open, but assists him in keeping it so—supporting the parts in that position so as to give some rest to the muscles which would otherwise have to be constantly exerted. On strongly calling the will into antagonistic action, the patient can shut his mouth almost completely, and the very consciousness of his ability to do so in great part overcomes the instinctive opposition to the touch of instruments in the fauces. As soon as the will relaxes, the instrument, by its elastic spring-power, tends to keep the

* The instrument has been made by Geo. Tiemann & Co., 63 Chatham street.

mouth open again, the operator, by simply pressing with his thumb on the metallic strip, can also steadily keep it open for any special purpose. The width of the mouthkeeper is altered with ease by simply pressing the wires nearer together, or stretching them further apart, while a new piece of india-rubber tubing may as easily be slided over them for every new patient. The laryngoscope- (palate-hook, etc.) holder conveniently fixates an instrument in any position, and allows it to be easily and quickly removed and replaced, so that the operator may have both hands free. Finally, the tongue blade can easily be freed from the mouthkeeper and mirror-holder, and used alone like the common tongue-spatula; or, the mouthkeeper can be used alone, or together only with the mirror-holder (which I frequently do, letting the patient hold his tongue, horizontally protruded, with his own fingers, gloved or guarded with a handkerchief or towel) so that the apparatus is really adapted to many different ways of employment, despite its simplicity of arrangement.

When carefully introduced, I have found (and, indeed, with some surprise) that patients have well borne this instrument whose throats are excessively sensitive. Certainly, in all cases where the mouth has to be kept open any considerable length of time—whether for purposes of examination or operation, and whatever portion of the oral cavity, fauces, pharyngo-nasal space, larynx, or of any organ that can be reached from the mouth, is involved—the advantages it offers must at once strike every practical mind.

To apply it, push the mouth-keeper as far forward upon the spatula, and make it lie as flatly upon it as possible; be careful to introduce it well into the mouth, and to have the tongue properly under it; direct the patient to open the mouth as far as may be required for the particular object of the application; advance the spatula towards the base of the tongue, and fasten the spring or india-rubber webbing.

Both in applying instruments, and in all laryngoscopic examinations, the patient's attention must be specially called to his constantly exerting his will forcibly to protrude his tongue; the holding alone is else not sufficient.

Properly placed, and with a sufficient amount of natural or

artificial light—with or without concentration—entering the oral cavity, this apparatus brings the whole of the fauces more thoroughly into view, on direct inspection, than any other instrument, or combination of instruments, of which I have any knowledge. *It freely reveals, in the majority of cases, at the first sitting, the whole anterior surface of the epiglottis.*

For indirect or mediate inspection a little mirror is needed in addition. This constitutes the laryngoscope. When it is duly held against the uvula—the larynx, trachea, and bifurcation of the latter into the right and left bronchi are distinctly seen.

Section 3.—*Principle of Laryngoscopy.*

How exceedingly simple, therefore, is the principle on which laryngoscopy is founded! In the words of Czermak, the eminent professor of physiology in the University of Prague:

"A small, flat mirror, with a long stem, previously warmed, to prevent its being tarnished by the breath, is introduced into the mouth, widely open, as far as its back part. It is then held up in such a manner as to permit the rays to penetrate it, on the one hand, and consequently to illuminate those parts which it is desirable to examine; and on the other hand, the image of those parts is reflected into the eye of the observer."*

Section 4.—*Obstacles and Difficulties in Performing Laryngoscopy.*

I must not conceal, however, that in concluding the description of the method, Czermak adds:

"Nevertheless, in spite of the simplicity of the principle, many obstacles and difficulties present themselves against the advantageous employment of the laryngoscope, and its correct appreciation by physiologists and physicians. Even actually notwithstanding the numerous proofs of its application, many persons become discouraged after certain fruitless attempts, as did my predecessors up to the time of Garcia.

"These difficulties and obstacles result in part from the excitability, sometimes very considerable, at the back part of the

* On the Laryngoscope and its Employment in Physiology and Medicine. By Dr. J. N. Czermak, Professor, &c. Translated from the French edition by George D. Gibb, M.D., M.A., &c., &c. The New Sydenham Society. London, 1861, p. 7.

mouth, on its coming into contact with a foreign body; from the difficulty which many persons experience in opening their mouths wide enough, and of mastering the movements of the tongue; also from the conformation and unfavorable disposition of organs; and, in fine, chiefly *from the inexperience and awkwardness of the investigator.*

"The introduction of the mirror with facility and confidence, and consequently without any unusual excitement of the back part of the mouth; its prompt application to the most favorable and least sensitive spot; the habit of detecting and recognising the reflected image, particularly of those regions but little known, and when the parts are movable; the directions to be given to the individual undergoing examination, to perform certain movements, and to assume the attitude necessary to the most favorable arrangement of the various parts of the mouth and pharynx; in fine, the regulation of the light, and of the visual direction;—all these circumstances require a degree of practice and dexterity which can be attained only by *great perseverance*, conjoined with some preliminary knowledge, and some amount of natural skill.

"These circumstances will always be very grave obstacles for the beginner, and will cause those physicians to hesitate in the employment of the laryngoscope who do not intend to make a *specialty* of laryngoscopy.

"Many other methods of examination, however, offer the same difficulties at the commencement, but these do not in the least detract from their value; as an instance, I will here cite the ophthalmoscope, which certain persons only have learned to use with success."*

Section 5.—*Structures rendered Visible by Laryngoscopy.*

The individual parts revealed by the laryngoscope, which are otherwise completely invisible or rarely or never seen without difficulty, are: the postero-inferior portion of the base of the tongue; the glossal insertion and posterior surface of the glosso-palatine arches; the glosso-hyoid folds, or lateral glosso-hyoid ligaments; the glosso-epiglottic ligament; the valleculæ; the pharyngo-palatine arches with the vestibulum pharyngis medium; the pharyngo-epiglottic ligaments; the lateral hyo-epiglottic ligaments; the epiglottis, *i.e.* its free anterior surface, lateral and upper borders and crest, and whole posterior surface;

* Op. cit., pp. 9–10.

the capitulum of the hyoid bone; the aryteno-epiglottic, or as they should be named more briefly "ary"-epiglottic, folds; the cuneiform cartilages; the supra-arytenoid cartilages; the arytenoid cartilages; the inter-arytenoid fold; the pyriform sinuses; the posterior wall of the pharynx down to its attachment to the cricoid and arytenoid cartilages; the upper cavity of the larynx with all its anatomical relations and contents; a portion of the lower cavity of the larynx, *i.e.* particularly its anterior wall; and the anterior wall, and sometimes lateral walls of the trachea for a more or less considerable distance down: under favorable circumstances down to the bifurcation, and in a few instances, placed on record by able observers, even throughout the whole length of the right bronchus.

The posterior part of the mucous membrane of the intercartilaginous rima glottidis, and the posterior and lateral portions of the lower laryngeal cavity, as well as the lower portions of the trachea, and further down, can usually not at all, or but imperfectly be seen.

Section 6.—*Rhinoscopy, and the Organs revealed thereby.*

With the further addition of a little hook, to hold, as occasion requires, the uvula and soft palate out of the way, the apparatus descibed for laryngoscopy reveals, on mediate inspection in the same little mirror—previously warmed as before, and now turned upwards—the posterior surface of the velum and upper posterior wall of the pharynx, the orifices of the Eustachian tubes, and Rosenmüller's fossa, the posterior nasal septum and nares, the turbinated bone and turbinated processes of the ethmoid bone, in short, the whole pharyngo-nasal space (bounded on the sides by the pterygoid processes of the sphenoid bone; in front by the nasal fossæ, above by the body of the sphenoid bone, and behind by the basilar portion of the occipital bone and upper cervical vertebræ), under favorable circumstances, to the covering mucous membrane of the nasal bones, and of the plate of the ethmoid.

Section 7.—*Œsophagoscopy.*

If, instead of the palate-hook, we add to our little mirror and other apparatus a proper forceps, we have the outfit for œso-

phagoscopy. This renders the dilatation of the œsophagus necessary, and although I have not yet succeeded in obtaining a good view into the œsophagus, except at its commencement, yet that œsophagoscopy can be accomplished, even if but to a limited extent, has been proved by the practice of Lewin in Berlin, and Sémeleder in Vienna.

SECTION 8.—*Surgical Anatomy of the Larynx and Neighboring Parts, with a Reference to the Liability to Disease of the Individual Regions.*

In respect to the anatomical details of the larynx, I have found to exist so much confusion in the mind of many physicians, that before proceeding with the subject proper of this essay, I deem it necessary to present a few remarks on the surgical anatomy in connexion with the liability to disease of the individual laryngeal regions.

The anterior surface of the larynx is covered in the mesial line only by the junction of the thin sterno-hyoid muscles (or their fasciæ if they do not quite meet), connective tissue, and skin. Upon this superficial position is based the method of so-called "translumination," first practised by CZERMAK, which, in delicately built persons, enables us, on directing concentrated light upon this region externally, to behold in the laryngoscope the vocal cords and surrounding parts in a beautiful incandescent red glimmer. Only a narrow strip in the middle of the fore-part of the neck can be thus "transluminated," for further laterally the larynx is covered by a number of muscles in addition to the structures named. The epiglottis presents a projection about half an inch high at the very base of the tongue, convex below and slightly concave above; its usual position is much more upright than most physicians imagine. Ordinarily, it makes an angle of from 50–60° with the glottis, below; and above, owing to its greater inclination forwards, an angle of from 70–80°. It is subject during life, *physiologically*, to many changes of form and position. Its greatest inclination backwards during deglutition to close up the larynx, is usually accompanied with considerable turning up of its upper (then of course its posterior) region, caused, according to LUSCHKA, by the stylo-pharyngeal muscles, and not by contraction of the pha-

rynx. During retching and attempts of vomiting, this turning up is also observable with the laryngoscope. During deep and hollow intonation the epiglottis is also more or less slightly inclined backwards; and I have often found it *pathologically* in this retroflected condition, especially—as first described by Lewin—in clergymen, who habitually strain their voices, in the production of deep and hollow or pathetic tones. In a case sent to me for examination by Dr. Green, in which the voice was notably hollow and deep toned, I found the epiglottis so persistently inclined backwards that in spite of all my manœuvres I could obtain no glimpse of the interior of the larynx, although I had some time previously seen in the same gentleman the whole of it, even the petiolus epiglottidis, a circumscribed ulcer near it, etc. The retroflection in this, in many respects interesting, case was doubtless owing to an altered (probably swollen or contracted) condition of the ary-epiglottic folds, which had been touched with nitrate of silver along with other portions of the larynx that required it. The mucous membrane covering the epiglottis forms between it and the tongue in the middle line of the body, a vertical fold or frænum, viz. the glosso-epiglottic fold or ligament. The *two lateral glosso-epiglottic folds*, of which all our text-books speak, do not constantly exist. This was first proved by Merkel with the laryngoscope, and confirmed by me by numerous examinations, although, to be sure, the mucous membrane in this position may, in the dead larynx cut out, be pulled up in half-a-dozen folds if one likes. There is, however, a glosso-hyoid fold or lateral ligament which, in connexion with the lateral hyo-epiglottic fold or ligament, passes towards the horn of the hyoid bone, and is lost in the soft parts in the lateral wall of the pharynx.

Just in front of the epiglottis, and separated by the glosso-epiglottic ligament, there are two ovoid depressions which I have already named as being fully brought into view by means of the laryngoscope. I speak of the valleculæ (Tourtual) or glosso-epiglottic sinuses. They are deepest by the side of the frænum and become laterally gradually shallower, until the mucous membrane forming their floor passes upwards into the lateral wall of the middle vestibulum of the pharynx. The valleculæ have neither anatomically, physiologically, nor pathologically,

received sufficient attention as yet. Aside from noticing that foreign bodies, such as fish-bones, may occasionally lodge in them, medical men generally ignore their existence. Yet I have, in many instances, found them to be the seat of serious—and frequently obstinate, only because unknown—morbid processes, for which other portions of the throat had been carefully (but of course unsuccessfully) explored and treated. GREEN has expressed his belief that tuberculous degeneration frequently *commences* here. LEWIN has reported syphilitic and scrofulous ulcerations in them, completely piercing in one case the mucous membrane. Another case is reported by Lewin, in which a mulberry excrescence of syphilitic origin seated here produced by pressure upon the epiglottis symptoms of asthma. One of the most surprising effects I have ever seen in my practice was produced in the case of a young lady, who had for more than a year been suffering from a "peculiar irritation" (the diagnosis of one of her previous attendants). She made constant, though vain, forcible attempts at clearing her throat, accompanied by various noises, which even by an exertion of her will she appeared unable to repress longer than fifteen or twenty minutes, and which I was told continued even during sleep. The expulsion of sputum was not attended with much relief; the sputa were usually greyish, of variable consistency and quantity; usually they were not abundant. I found the valleculæ in a state of chronic inflammation, probably catarrhal, and, as the patient intended to leave the city on the next day, made within ten hours three applications of a solution of nitrate of silver (20 grains to the ounce). Very soon after the first application she could stop the efforts described for nearly two hours; and after the third, they ceased altogether. She returned two weeks later for treatment, though the distressing symptom had not reappeared. When I discharged her after about a month, the mucous membrane was still thickened and discolored, but she has remained perfectly well now for a year and a half.

Another young woman came to my clinic at the University, on the 2d of April last year, with ulceration of the valleculæ, which she had had for a long time, and from which she suffered very much every few months. She had vainly sought relief from several physicians and at two other college clinics of the city,

which I thought the more remarkable as the patient, a rather intelligent girl, related *unasked* one symptom which certainly should have directed attention to the spot really affected. She said she had long noticed that "eating sour apples, they hurted very much in the top of the throat," while, when she cut the apple into good-sized morsels, she could swallow these without the slightest pain. A few topical applications of a saturated solution of chlorate of potash in water and glycerine, after a primary cauterization, entirely and most likely permanently cured her.

On its posterior aspect, the larynx presents a middle and two lateral regions. The lateral regions contain the pharyngo-laryngeal fossæ or pyriform sinuses, to which, among others, the objectionable name "subtonsilar fossæ" has been given.

Along the angular floor of each pyriform sinus there is a chain of glands, which in a large percentage of the cases in which disease invades the sinus are involved in the particular morbid process: Accumulation and degeneration of their secretion, abscess formation and ulceration are comparatively often met with. Green observed among several cases of ulceration in this region, one in conjunction with Valentine Mott, in which by a little manipulation, pulling the cheek aside, etc., the higher portions of the sinuses could be seen, one at a time, and thus the diagnosis that had long baffled the attendant physician, satisfactorily made out. At the present day such a diagnosis can, with the laryngoscope, be made with the utmost ease and certainty. In a very interesting case sent to me by Dr. Wiener, I found immediately on the first examination, besides a chronic catarrh of the larynx and upper portion of the tracheal mucous membrane, follicular ulceration of the pyriform sinus on both sides: Louis D., a native of Germany, aged 17 years, working as a tinsmith, after exposure a year and a half before I saw him, "caught a severe cold and cough." He had taken all sorts of cough mixtures, domestic, and from doctors, regular and irregular, had been to the German Dispensary, the College of Physicians and Surgeons, etc., etc. Since six weeks the cough had become *truly terrible*, a ceaseless hacking night and day. When the lad came to me he presented the obvious signs of a rapid consumption; he was extremely

weak and emaciated, with a pulse varying from 120 to 130, hectic flush on cheeks, and cold extremities. He could obtain but little sleep, and had also nightsweats, but overweighing all else was the cough: constant, irritating, hacking, severe beyond description. This patient is still under treatment for his laryngeal catarrh, and I may report his case in detail on some future occasion; here I will only add that I limited myself at first to applying, under sight, medication into the pyriform sinuses, and that after the tenth application the ulcers had healed, and the terrible hacking cough entirely disappeared. He still coughs and expectorates a little every morning, but his general health is most excellent.

At its lower boundary the larynx communicates with the windpipe by its tracheal or inferior aperture or orifice, and at its upper with the cavity of the pharynx by its pharyngeal or superior aperture or orifice. As I have frequently heard physicians inadvertently call the upper aperture of the larynx the glottis, I call particular attention to the fact that this careless nomenclature has led to much confusion.

While the inferior aperture is circular, the superior is triangular, or somewhat cordiform, wide in front, narrow behind, sloping obliquely downwards and backwards, and terminating behind in a vertical notch or fissure, called the arytenoid fissure. It is subject, during the various physiological processes, to manifold variations in form, and its edge or border presents some important points of observation. This border is formed in front by the top and free portion of the side of the epiglottis, and its shape here may be approximated by the junction of two irregularly shaped Ss. On each side comes next the ary-epiglottic fold, a fold of mucous membrane, inclosing ligamentous and muscular fibres, stretched between the side of the epiglottis and the apex of the arytenoid cartilage. I have proposed the name "ary"-epiglottic instead of the usual one "aryteno"-epiglottic, as being more brief, quite as intelligible, and in conformity with that of the German anatomists. The portion of the border of the superior aperture formed by this fold—by far the larger portion—makes two slight concavities, the anterior larger than the posterior. At the junction of the two concavities or festoons, is a roundish,

more or less distinct whitish prominence: "Wrisberg's tubercle, nodule, or corniculum," produced by the extremity of the cuneiform cartilage, called the cartilage of Wrisberg, which extremity is surrounded by a mass of glands. At the arytenoid fissure, the border of the upper laryngeal aperture rests upon the supra-arytenoid cartilages, called the cartilages of Santorini, and just at the commencement of the fissure, these also form on each side a roundish, more or less distinct prominence: "Santorini's tubercle, nodule, or corniculum." The aryepiglottic folds, being reflected plates of mucous membrane united by loose, long-fibred connective tissue, on account of their structure greatly favor infiltration; they may thereby be changed into soft thick cushions, approaching and even joining each other, which state constitutes that imminently dangerous and pressing evil, œdema of the folds or of the superior aperture, so frequently erroneously and incorrectly termed œdema of the glottis. I have found these folds also in numerous instances inflamed, thickened, ulcerated, and secondarily shortened, these conditions giving rise to corresponding, more or less severe subjective phenomena of great pathological interest. A small ulcer here sometimes produces difficulties of swallowing, sometimes an obstinate cough, long resisting all medication, yet yielding with surprising rapidity to the simplest local application, accurately touching the spot.

During ordinary breathing and deep inspiration the superior aperture is trapezoidal, and the inter-arytenoid fold or ligament completes its border; but during phonation, etc., the fold disappears by the shortening of the arytenoid muscles. The form of the upper aperture must be studied most attentively by the laryngoscopist. He must be able to recognise it under all circumstances, however much altered by congenital formation, physiological processes, or pathological change. Its border is the frame of the picture veiled from mortal gaze direct, which his mirror brings under the field of his vision.

The consideration of the upper aperture of the larynx leads us to its interior. This is divided into two cavities, an upper and a lower, by two horizontal lateral projections. The superior cavity of the larynx extends from the superior aperture to the *area of the glottis, i.e.* to the upper surface of the vocal

cords, which *par excellence* constitute the projections mentioned; the inferior cavity extends from the lower surface of the vocal cords to the inferior aperture. By a cleft-like space between the vocal cords the two cavities intercommunicate. The walls of these cavities, especially those of the upper, are so important in every point of view that I feel bound to describe them somewhat in detail.

The *front wall* of the superior laryngeal cavity is formed by the posterior face of the epiglottis throughout its whole extent, and the portion above the attachment of the vocal cords of the entering angle of the thyroid cartilage. It descends as a gutter-like groove between the anterior extremities of the ventricular folds to the limit of the vocal cords. This groove, which is called the "central fossa" of the larynx, is the posterior surface of the pomum Adami, and a very important point of insertion for the aryteno-thyroid ligaments, etc. Characteristic ulcerations of various origin, and abscesses are found, especially in the lower regions of this front wall, and I shall describe particularly the mode of reaching them.

The more easily to designate the *lateral walls* of the superior cavity of the larynx, I have adopted for each the name "quadrangular membrane." At their junction with the front wall the two form two grooves, which, running downwards, unite in the central fossa. These lateral walls contain the sacculi and ventricles. Each ventricle—also called "ventricle of Morgagni," and sometimes "entrance to the sacculus"—is an oblong fossa, extending just above the vocal cords for nearly their whole length. It is bounded behind by a small semilunar fold near the attachment of each vocal cord; below by the upper surface of the latter, *i.e.* by the lip of the glottis or lateral floor of the superior cavity; in front by a little fold, sometimes wedge-shaped, sometimes semilunar like the one behind, and above by an arched border of mucous membrane, called the ventricular band or fold. The ventricular bands are crescentic projecting folds of mucous membrane, commencing at the commencement of the central fossa, and extending with their concavity looking downwards to the little valvular fold which forms the posterior boundary of the ventricle, and which is indicated on the front surface of the arytenoid cartilage by a

slight depression. Whether they are simply duplications of mucous membrane, or whether they each inclose a ligament and muscle, has been the subject of some controversy. Under the idea that they did inclose ligamentous and muscular fibres and contributed to the production of voice they have been called "superior vocal cords." When it was shown they were not directly nor at all essentially concerned in phonation, they were called "false vocal cords." They appear to contain a delicate and thin fibrous band of elastic tissue, "the superior thyro-arytenoid ligament," continuous with the "fibrous capsule" of the sacculus, without muscular fibres; they certainly do not vibrate, and even though they do exert some influence on the sound of certain notes—a matter which is not yet clearly proven—I do not accord to them the name of "vocal cords." Although they are brought nearer to each other by the movements of other parts, it is very exceptional for them, I believe, in the normal condition entirely to meet; in myself, at least, and in all the healthy individuals I have examined in reference to this point, it is certain that the space between them, the incorrectly termed "false glottis" or "false rima glottidis," is always larger than the rima, thus showing the vocal cords below.

If a properly bent probe or hook be introduced into the ventricle, and directed upwards, it would enter a considerable cœcal pouch, called the laryngeal pouch, or the "sacculus laryngis." This is a membranous sac extending within the quadrangular membrane between its duplicature and the thyroid cartilage, as high up, usually, as the upper border of the latter, sometimes even beyond this, but rarely failing to come up so high. On an average its height measures from four to six lines. In form it is conical, curved slightly backwards, and resembling somewhat a "Phrygian cap." Inside, on the mucous membrane, there are the openings of sixty or seventy small follicular glands which are situated in the submucous cellular tissue, and give its external surface when exposed in the dead body a rough and ill-dissected appearance. These sacculi seem mainly placed here to allow room for the undisturbed vibration of the vocal cords, but they also lubricate with the mucus secreted by their numerous acinous glands, the vocal cords, which are unprovided with mucous glands of

their own. There is no portion of the inner surface of the quadrangular membranes which I have not already found diseased. All kinds of morbid processes in this region: adventitious growths, injury from foreign bodies, inflammation, œdema, thickening, softening, atrophy, ulceration, etc., are represented in my record of cases, a selection of the most interesting of which, with colored illustrations of the laryngoscopic appearances, I intend soon to publish. Laryngeal polypous and other tumors, which are of far more common occurrence than was imagined before the introduction of the laryngoscope, are most frequently situated on these walls, especially the ventricular cords, ventricles, and just back of the anterior vocal processes.

Owing to the downward slope from before backwards of the side walls, the *posterior wall* of the upper cavity of the larynx is only one-third of an inch high; and the arytenoid fissure goes in the median line from the top through almost its whole extent. It is formed by the cartilages of Santorini, and so much of the arytenoids as projects above the vocal cords. It does not rise up entirely vertically to the plane of the vocal cords, and its upper border is nearer to the opposite wall than its base. It is very variable in width on account of the mobility especially of the arytenoid cartilages, and for the same reason the fissure sometimes appears entirely obliterated, i. e. as a very narrow cleft or chink, from the approximation of the arytenoids, and sometimes is visible only as a long and shallow concavity from the wide separation of the arytenoids. Even more frequently than in any portion of the larynx hitherto mentioned, have I found disease in the posterior wall of its upper cavity, and for the sake of convenience and brevity in description, I have given the name "Posterior Glottis" to the whole of this wall. New growths are rare in this situation, but "irritation," hyperæmia, follicular inflammation, thickening of the mucous membrane, infiltrations, degenerations, erosions, and ulcerations so much the more common. I have discovered the tuberculous process going on here, when the most careful examination of the lungs failed to convince me of its ravages; and in more than one instance my diagnosis of tuberculosis, based on laryngoscopic examination, was proved only too correct by subsequent progressive developments. It gives

me the utmost pleasure that my observations in this respect have been entirely and independently confirmed by those of Lewin, Czermak, Störk, and others. Dr. Green's extensive experience, if I understand it rightly, also bears out this observation. Lewin insists earnestly and eloquently on the laryngoscopic examination as indispensable in every case where unproved suspicions of tuberculosis and syphilis exist, and asserts that *every one of very numerous diagnoses, based by him on such examination, has proved correct.*

The *floor* of the upper laryngeal cavity is formed by the two lips, or lateral projections in the interior of the larynx, constituting together the glottis. Each lip of the glottis is of prismatic shape in its vertical section, with a sharp, free edge. Its upper surface is horizontal, consequently its lower surface—the *top or roof* of the *lower cavity* of the larynx—is slanting, forming a more or less acute angle. Its edge constitutes the vocal cord. For those who withhold the name "vocal cords" from the ventricular folds, this designation suffices, without the epithet "inferior" or "true." Each vocal cord extends from the anterior vocal process (a little projection in the central fossa, between the two alæ of the thyroid cartilage) to the posterior vocal process (a similar projection at the anterior angle of the base of each arytenoid cartilage). It is composed of a peculiar band of elastic tissue —a portion of the elastic membrane of the larynx—called generally the inferior thyro-arytenoid ligament, parallel to which, and adherently adjoining which, lies the thyro-arytenoid muscle, covered, of course, by mucous membrane. The fissure or chink between the vocal cords is the "rima glottidis." Its length in the male is about an inch (11⅓ lines); its breadth, when dilated, varies at its widest part from ⅓ to ½ inch (during deepest inspiration even from 7 to 10 lines); in the female these measurements are less by 2 or 3 lines. The rima is divisible into two portions, viz. the anterior, the interligamentous rima—corresponding in length to the length of the vocal cords, i. e. about 8 lines,—and the posterior portion, or intercartilaginous rima, about 3 lines long. To do away with a confusion of terms which has frequently led to a confusion of ideas, I do not use the names "glottis" and "rima glotti-

dis" as synonyms, but strictly define each, as well as "posterior glottis," etc.; a distinction must also be made between the *mechanism of closure* of the larynx,—i. e. of its superior aperture—and that of the rima. This nomenclature I have always taught in my lectures, and have for a long time exclusively used. The vocal cords and rima glottidis form the climax in importance attached to the various portions of the larynx. Usually they are in a laryngoscopic examination the "central point of attraction," and by them the laryngoscopist generally *orients* himself in his survey. Their integrity is essential to the full performance of the functions of the larynx; and the morbid processes to which they are liable, are invested with the greatest interest. Alterations of color, size, form, and texture of the vocal cords, have been observed; many instances of anomalies of mobility and tension, paralyses and asymmetric action, as well as new growths and ulcerations of various characters, most often tuberculous, have recently been placed on record. In two adult deafmutes, laryngoscoped by Gibb, the vocal cords were wanting. Acquired disease may entirely destroy them, or reduce them to shreds, useless, and worse than useless; but sometimes nature seems very curiously to protect them from destruction, a remarkable example of which I observed in a case of syphilitic ulceration, sent to me for examination by Dr. Richards. Here a rapidly spreading ulceration curiously passed all around the walls of the cavity before involving the vocal cords; the ultimate fate I have not learned.*

The inferior cavity of the larynx is but seldom the seat of disease. The walls are formed by the cricoid cartilage, the lower portion of the thyroid, the base of the arytenoid cartilages, and elastic and mucous membrane. These walls converge upwards from the circular aperture, more or less according to the width of the rima. Semeleder, who seems to have been the first who recognized the lower thyroid notch from the inside,

* Since writing the above, I have examined this patient several times. The vocal cords have been preserved, but so much contraction of the inner plate of mucous membrane involved has taken place, that the ary-epiglottic folds are pulled down (especially on one side), overlying the ventricular folds and vocal cords, and giving to his voice a muffled sound.

has repeatedly observed in the living subject the cicatrix of laryngotomy wounds.

The brief sketch of regional anatomy that I have given, by no means comprises all the anatomical knowledge requisite. The larynx consists of a framework of cartilages, covered with perichondrium, united by ligaments, moved by muscles, supplied with arteries, veins, lymphatics, and nerves, and lined by a peculiar elastic, and a mucous membrane, together with connective and adipose tissue; and with all these component parts, in their individuality and totality, every one must render himself familiar, who would practise laryngoscopy for medical purposes with satisfaction or success. I do not propose in this place to enter into their description, except in relation to one among them, the laryngeal mucous membrane. Of all the tissues in the body, as Chambers justly remarks,* mucous membrane is the one most affected by decomposition after death,—and therefore presents, on post-mortem examination, the worst possible picture of its condition during life. The laryngeal mucous membrane, as dissection shows it, is about as much like the laryngeal mucous membrane in health, "as the crumpled folds of dank parchment which surround the mouth of a corpse resemble the same lips swelling with joy and expression." A minute's careful look into the interior of the living larynx, is worth ten hours' study of an anatomical preparation; "one sketch drawn from the life is worth ten from the museum." Dissection teaches us that the mucous membrane follows, by corresponding duplicatures and reflections, the various prominences and concavities, resulting from the disposition of the cartilages and elastic membrane; that the position of glands is indicated by roundish elevations here and there, and the mouths of the glands by numerous minute pores, as from the prick of a pin, and that no papillæ are observable except some traces at the border of the epiglottis; dissection teaches us that the laryngeal mucous membrane does not possess a uniform thickness, nor is alike closely adherent throughout its whole extent: thus, that it is very thin and very closely attached at the free edges of the vocal cords, still thin

* Renewal of Life, by Thomas K. Chambers, M.D., p. 495.

but less adherent inside the sacculi, closely adherent and thicker on the inside of the epiglottis, vocal processes, and lower laryngeal cavity, while its attachment is quite loose where it forms the ary-epiglottic folds, and somewhat so, also, at the posterior glottis; but its precise coloration, during life, we can learn from laryngoscopic inspection only. Störk was the first to describe this correctly. In a healthy individual, breathing quietly, not excited physically or emotionally, whose laryngeal mucous membrane is not irritated by any local cause, the anterior surface of the epiglottis, examined by natural light, corresponds in coloration to the conjunctiva palpebrarum when slightly injected: is, therefore, somewhat reddish yellow. Wherever the mucous membrane covers cartilage, the more closely adherent parts are less injected: thus, that on the upper and lateral free borders of the epiglottis is less injected; but it ceases to be whitish on passing into the ary-epiglottic folds, the normal color of which is quite red. The inner plate of mucous membrane then passes clear down to the vocal cord before its color changes. It looks somewhat like the mucous membrane covering the gums, and so does that of the sides of the posterior glottis, while the inter-arytenoid fold looks more greyish. The vocal cords look white with a peculiar metallico-tendinous brilliancy; corresponding to their attachments are four yellow spots indicating the vocal processes, two in front and two posteriorly; the latter are the larger and most important in judging of the motions of the vocal processes, and the tension of the vocal cords. The cricoid and thyroid cartilages, where not otherwise covered, look white with a reddish tint. The cartilaginous rings of the trachea look white, the intermembranous portions reddish; at the bifurcation, where that is visible, and beyond, the parts appear more darkly colored.

Section 9.—*Description of the Instruments for Conveying Remedial Agents into the Interior of the Larynx.*

The set of instruments with which I convey the various remedial agents into the larynx consists of the following:—

A laryngeal Brush (Fig. 2).

A laryngeal Sponge-carrier (Fig. 3).

A laryngeal Porte-caustic (Fig. 4).

A laryngeal Insufflation tube (Fig. 5).
A laryngeal Fumigation tube (Fig 6), and
A laryngeal Electropole (Fig. 7).

The most essential peculiarity of these instruments is their size and exact bend. The object is to be able to pass them directly back and down into the larynx, and then, under sight, to touch, if desired, a small or limited spot. I have made measurements and experiments with great care in numerous dead and living, healthy and diseased throats, with the tongue in the position in which it is during laryngoscopic examination, and the result reached is that the instrument should be bent at one and a quarter right angle.

An important item in the construction of any instrument to be used for the medication under consideration is its size at the laryngeal end. The smaller it is, the less space and light will it take away, and the more accurate will be the touch that can be made with it. The length and other dimensions, as well as the form and size of the handle (which latter is made of hard rubber) have been adopted after much experience with various kinds and dimensions. The length of the handle is three and a half inches, thence to the bend the same distance, and to the straightened end nearly five and a half inches.

In their general characteristics all these instruments are alike; I can finish their individual description in a few words.

The *laryngeal brush* (Fig. 2) is provided with a little screw ring, so that the brush part can be easily removed and again

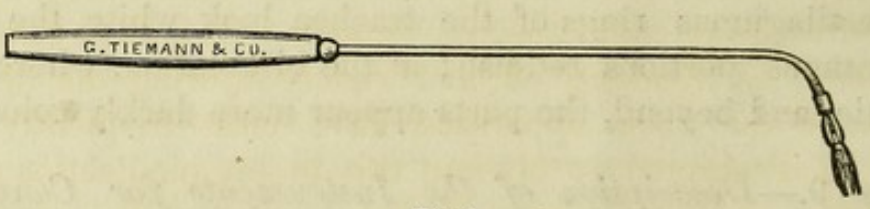

Fig. 2.

firmly attached. This is of great importance when hair brushes are used. I have used glass brushes, and wire brushes (made of gold, silver, platinum, and other metals), but they are not satisfactory. I think that asbestus brushes answer the purpose best in every particular, resisting the action

of caustics, etc., and a good quality of badger or camel-hair next best.

The *laryngeal sponge-carrier* (Fig. 3) is a modification and adaptation to my purpose of Granger's. The original flexibility

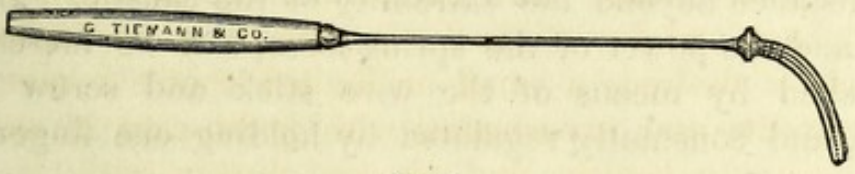

Fig. 3.

is changed, the bayonet-fastening replaced by the improved screw and ring, and, above all, the proper bend and size are given it. By easily enabling (and indeed inducing) the operator to use a fresh piece of sponge or lint after every application, this instrument is a very valuable one.

The *laryngeal porte-caustic* (Fig. 4) possesses an important

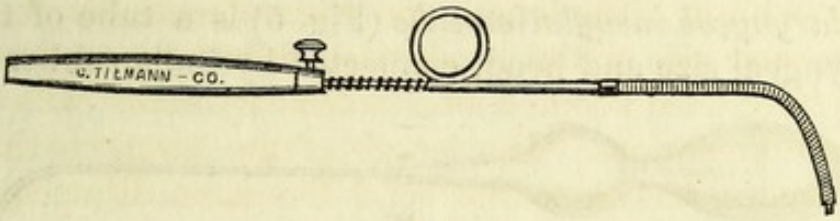

Fig. 4.

original feature, I believe. My first object was to introduce a piece of caustic into the cavity of the larynx, which I could uncover, and which should cover itself again in an instant. From the practice of others, as well as my own, I had learned that the proper withdrawal of caustics is sometimes rendered extremely difficult after an application has been made, by the patient's retching and other movements. It is then that accidents, such as breaking off, and rudely injuring the delicate portions of the vocal apparatus, have most frequently happened. I attempted to obviate this in my medication under sight, and I have entirely succeeded, by means of a wire coil, which is held back when the caustic is to touch any part, and immediately, on being released, springs forward and covers the caustic with a pliable shield. In order to preserve the exact size and bend of the instrument when in use, I was forced to reject the usual construction of porte-caustics, in which the caustic is withdrawn and pushed out, and to devise in its stead

a movable covering. The details of my construction are simple, and obvious at a glance. When the coil is retracted by the ring, the spiral spring next to the handle is pressed together, and, on letting go the ring, the spring-power projects the coil some distance beyond the extremity of the caustic. This distance, and the power of the spring-force, can be increased or diminished by means of the wire stick and screw in the handle, and constantly regulated by holding one finger in the ring.

I used to arrange the coil so that it would bring forward with its projection a pad with dissolved salt, to neutralize the nitrate of silver (which can easily be accomplished), but with greater experience and more carefulness and precision in making the application I now find this precaution *generally* unnecessary. Other caustics, as caustic potassa in stick, chromic acid, etc., can also safely be fastened in this porte-caustic.

The *laryngeal insufflation-tube* (Fig. 5) is a tube of the proper laryngeal size and bend, connected by india-rubber tubing

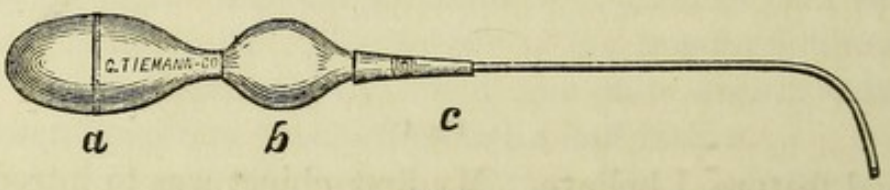

Fig. 5.

(*c* in the figure) with a glass bulb (*b*), which receives any powder to be insufflated. The instrument is carefully introduced and directed to any predetermined spot by the aid of the laryngoscope, and the powder discharged by pressure upon the india-rubber bag (*a*) with one hand; or, a long india-rubber tube goes from the glass bulb to the operator's mouth, and thus the powder is blown upon the spot.

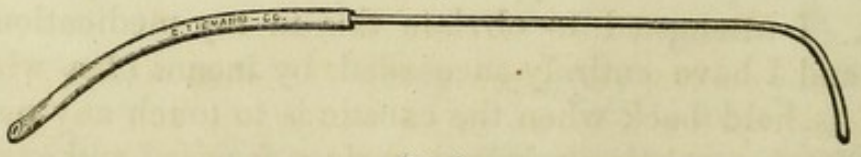

Fig. 6.

The *laryngeal fumigation-tube* (Fig. 6) is a tube similar to the preceding, made of hard rubber or silver, etc., according to circumstances, which is connected with the apparatus, disengaging the gas to be introduced.

The *laryngeal electropole* (Fig. 7), to carry the galvanic current, is a modification of Middeldorpf's Improved Gal-

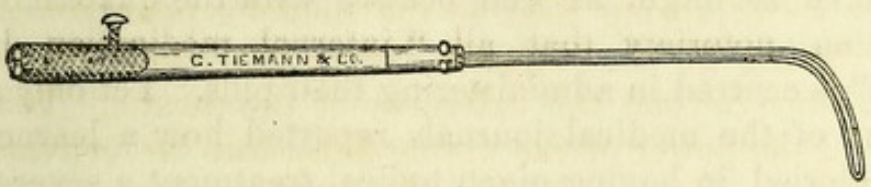

Fig. 7.

vano-Cauterizateur. While the button in the handle is pressed upon the current passes, otherwise the extremity is a simple piece of wire; yet when the double wire is in the handle (as figured in the cut), the extremity can be immediately rendered hot enough for effective actual cautery. The double wire may be taken out by unscrewing the little pins in the handle, and either a single wire introduced, connected with the negative pole of the battery, while the positive pole is held outside of the throat, over the larynx, or the two separate wires, one connected with the negative and one with the positive pole of the battery, may be placed into the handle and secured by the screws, and approximated or held apart at pleasure, so that both vocal cords, or any other two portions within the larynx or neighboring organs, may be brought into contact with either both poles at the same time or each separately.

[The description of other instruments for laryngoscopal *surgery*, viz. besides my own, the knives, scissors, and forceps of Von Bruns, Lewin, and Lindwurm, the laryngeal ecraseur of Gibb, etc., etc., I reserve for a future occasion, limiting myself for the present to the remark that "*morbid growths have already been removed from even below the vocal cords without the bloody laying open of the laryngeal cavity from without*, PER VIAS NATURALES, *by cutting instruments, by means of laryngoscopy!*"]

SECTION 10.—*Remedies Employed.*

Many physicians, on hearing the "topical medication of the larynx" spoken of, can think of naught but the application of *nitrate of silver*. Now, while it is true that on *commencing* to treat laryngeal diseases locally, most practitioners have been given to the exclusive use of this agent, and also, that those having had the amplest experience still regard it as exceedingly valuable when properly understood and restricted—it is a

great mistake to suppose that its use is necessarily implied, or that no other medicaments are suited to this method. Those that affect to believe so might as well believe with the quacksalvers of purgation notoriety that all "internal medication by the mouth" is centred in administering their pills. Yet only recently some of the medical journals reported how a learned professor gloried in having given topical treatment a severe blow, who ascribed to it the degradation of the science of medicine to the study of applying lunar caustic! I deem it scarcely necessary to say that no scientific specialist confines himself to such narrow limits. The remedial agents I have locally applied really embrace nearly all the classes usually made, viz. caustics, astringents, alteratives, stimulants, muscular excitants, contra-stimulants, protectives, anodynes, anæsthetics, and narcotics, as well as evacuation of blood: the ancient *summum remedium.* I have conveyed remedies to the spot with the brush, the sponge, the lint, and the electropole, and by injection, insufflation, and inhalation. I have used medicaments in all the forms possible, i.e. the solid, the liquid, and the aëriform; and of the latter both gases and vapors, the liquid both as such, and nebulized by the pulverization method, and the solid both in substance and in powder. To present a critical review of the individual agents employed would lengthen this essay to an inordinate degree. But I will at least enumerate most of those used by myself and others. At the head of the list still stands nitrate of silver in mitigated and unmitigated stick, and in solution varying from the slightest astringency to actual saturation. In mainly alphabetical order come next: Acids—acetic, pyroligneous (either alone or with creasote water), tannic (especially with belladonna), chromic, nitric and other mineral acids; aconite tincture with glycerine; atropine solution, and belladonna tincture; alum; bromide, and chloride of ammonium; benzine; borax; iodide, and chloride of bromine; sulphate of cadmium; catechu tinct.; capsicum tincture; chlorine, ozonized chlorine; cannabis indica tincture; chloroform; codeine tincture; coniin solution in sweet almond oil; aluminated sulphate of copper, nitrate of copper; creasote; digitalis tincture; ergotine solution; erygeron oil; eupatorium; gelsemin tincture; geranin tincture; glycerine; hyoscyamus tincture; iodine, in

various combinations, iodoform solution in oil; sesquichloride of iron tincture, perchloride solution, persulphate sol.; chloride of lime solution; iodide of lead, also tannate, and sulphate; myrrh tincture; acid nitrate, argento-nitrate of mercury, iodide, mild and corrosive chloride, iodo-chloride of mercury; morphine solution, and opium tincture; cod-liver, and olive oil; bromide, cyanide, iodide, and hydrargyro-iodide of potassium; bichromate, chlorate, iodate, nitrate, and permanganate of potash; Filhos' caustic, and Vienna paste in stick; rosin; common salt; sanguinaria; senega; iodide of silver and potassium; stramonium; strychnine; sugar; tar; turpentine; veratrum tincture; acetate, chloride, iodide of zinc, sulphate of zinc and alum, sulphate of zinc and morphia, etc.

SECTION 11.—*Method of Performing Laryngoscopal Medication.*

After the physician has made himself somewhat familiar with the handling of the instruments I have described, and if he knows the descriptive anatomy of the fauces, he will experience no great difficulty in reaching the various *ante-epiglottic* portions. Indeed, he is more likely to touch them unintentionally than to avoid doing so when desired. Involuntary and even only partial movements at deglutition on the part of the patient, cause great disappointment to the operator for a long time in his endeavors to touch a precise spot, proved by subsequent laryngoscopic inspection. To be able well to touch the anterior surface of the epiglottis, it is sometimes necessary to descend with the instrument into the vallecula, and to push the epiglottis away from it. The lateral and upper borders of the epiglottis can nearly always be easily reached. To touch the different points—especially the lower—of the front wall of the superior laryngeal cavity is sometimes very difficult; and it is here, as well as in touching the posterior wall ("posterior glottis"), that I have found it convenient to depart from the inclination which I have given to all my laryngeal instruments: instead of a bend of $1\frac{1}{4}$ right angle, I use one of a right angle for the anterior, and one of about $1\frac{1}{2}$ right angle for the posterior wall. To touch under sight a predetermined point on either ary-epiglottic fold, lateral wall of the upper cavity, or vocal cord, requires long practice on the part of the operator,

and always previous education on the part of the patient. Sometimes great aid can be had from the use of Lewin's Thimble to pull the epiglottis forward. In a patient able to bear it, either *pyriform sinus* may be touched at will. To carry the instrument, even if elongated, down between the cords and touch in the lower laryngeal cavity, in the trachea or—still lower—in the right bronchus, any point absolutely under sight, I have hitherto found utterly impossible; but it is truly astonishing how accurately the hand learns to execute the designs of the will after long continued patient and persevering efforts. I always make a laryngoscopic examination to assure myself positively of the result attained by an attempt at such application, and I rarely if ever fail to hit a spot previously made out, even if I do not see it actually at the time the touch is made. This leads me to say that very often—and this is true of every part of the larynx—just as the application is about to be effected—after the instrument has been guided towards the right spot—something, either a retching, coughing, or other motion of the patient, dulling or displacement of the mirror or reflector, or something else, prevents distinct seeing: and yet with coolness and dexterity on the part of the operator, the touch can accurately and rapidly be made. But if the instrument in the laryngeal cavity comes in contact with a part not intended to be touched, as well as immediately after the correct touch is made, all instruments must be rapidly yet carefully withdrawn. There is no use trying to correct a blunder, you must wait till next time. The touch of the instrument and medicine in the larynx—except in exceptional cases of extraordinary toleration—causes so much reflex action, that it is in all cases necessary to introduce the mirror another time to examine or increase the effectiveness of an application.

Section 12.—*Immediate Effects, Dangers, and Difficulties of Laryngoscopal Medication.*

The immediate effects of applying medication in these portions of the body, previously unused to such applications, usually consist of dyspnœa, "a choking sensation," "some burning," and more or less pain and difficulty of swallowing, as well as breathing. Generally all these symptoms pass off

speedily, and without leaving any unpleasant effect, but it is necessary to be aware of their course, so as to be able to preserve our own calmness and self-possession as well as to reassure the patient, and when severe applications are to be made, it is absolutely requisite to prepare the patient for them previously. Sometimes the consequent spasm and dyspnœa—amounting even to apnœa—become quite alarming. They do not, however, even then, usually last longer than some seconds, or at most minutes, and rapidly subside on freely taking cold water, and inhaling from a Wolfe's bottle a little chloroform when this becomes possible. In more or less marked degree, some of the symptoms insisted on by a Committee of the Academy of Medicine in the *Majority Report on Dr. Green's Paper concerning "Catheterism of the Air Passages,"* may be observed to follow in nearly every case in which the instrument is carried beyond the superior laryngeal aperture. They say there is "violent spasmodic cough, the face becomes red and anxious, and the patient manifests an eager disposition to withdraw the instrument or escape from the hands of the operator." If the instrument has passed through the rima, "these symptoms reach the maximum of their intensity; from being suffused and anxious, the face becomes swollen and livid; the veins of the neck and face become turgid; the eyes wild, prominent, and overflowing with tears; the respiration, for the moment interrupted, is renewed with long, loud, and croupy inspirations and expirations, attended with violent spasmodic cough and forcible ejections of bronchial mucus from the tube. So overpowering is the sense of suffocation at this moment, that the patient is with difficulty persuaded to allow the tube to remain, or that his attention is diverted to other objects.* But there is no inherent danger in the method; and when the indications for treatment are properly arrived at, the remedial agent and strength of dose suitable in a particular case well selected, and the application made by competent hands, the apparent serious consequences need inspire no fear whatever. As already stated, they will usually disappear in a few minutes, but even if exceptionally they do not subside at once, they will gradually

* The Transactions of the New York Academy of Medicine, vol. i., Part IV., p. 229.

do so, either of themselves or on reassuring the patient, to tranquillize his mind; making him breathe deeply and regularly, swallow a little ice water, gargle, then inhale a little of an anodyne or anæsthetic mixture; and applying cold, rubefacients, or fomentations externally to his throat.

Any one who has learned to practise laryngoscopy with ease and success, can master the method of *laryngoscopal medication* with the instruments I have described. Its feasibility and utility have been demonstrated in my private practice, as well as in my clinic, at the University of New York, before many physicians and medical students. The one thing needful to make it satisfactory to the operator and patient, is the acquisition of a habit of moving the hand in obedience to the will by indirect vision, i.e. the ability of carrying an instrument directly—boldly, delicately, and firmly, without touching neighboring parts—to a point indirectly seen, i.e. seen in a mirror. This habit or this ability, it must be confessed, is difficult to acquire, because it is in opposition to what seems, from long practice, to be instinctive; but that it *can be acquired thoroughly* through perseverance (of course only, too, after a thorough knowledge of the anatomy of the organs concerned has been obtained) is abundantly proved; and is there not also abundant inducement for *willing* to acquire this habit and this ability?

Section 13.—*Originator and Promoters of Laryngoscopal Medication.*

The method itself, by which "the eye becomes the guide to the hand" in the laryngeal regions, we owe entirely and solely to Czermak. He is as the pioneer, who, felling the sturdy timbers and blasting obstructing rocks, clears a path through the wilderness. Those who worthily co-operated by removing various obstacles still in the way, are Türck, Störk, Semeleder, Lewin, Gerhardt, Tobold, Sülzer, and Gilewski in Germany; Rauchfuss, in Russia; Moura-Bourouillou, Mandl, and Fournié in France; and Gibb, Mackenzie, James, and Johnson in England; while in this country, I have humbly, though I candidly trust also not unworthily, followed in the same footsteps in attempting to facilitate and improve the method. Though not strictly be-

longing to the subject, it is not alone from feelings of personal friendship and respect, but to render the justice so persistently denied him, that I add here also the name of one who deserves great credit for having, without seeing the interior of the larynx, guided the "probang and tube down to and beyond the vocal cords," in the darkness of ignorance and despite the overshadowing gloom of prejudice, long before the path had been illuminated by the genius of others. If justification of the practice, or confirmation of his assertions, was still needed, laryngoscopy must have appeared to him a very godsend to defend the right and prove the true! Indeed, though the means at our command at present are more in conformity with the exact and scientific requirements and discriminate indications of Pathology and Therapy, it cannot be denied that the name of Horace Green is inseparably and most honorably connected with the history of Topical Medication of the Larynx; and his methods and his success will for ever remain a brilliant monument of his intrepidity, perseverance, and skill.

Section 14.—*Conclusion.*

Those who cannot yet realize how much can actually be seen and touched with the laryngoscope and the instruments I have described, need but imagine a plane passed from the lip over the tongue backwards through the tissues from the cheeks to the back of the neck, and all the parts above this plane removed in the living body: all that the eye in front and above looking downwards could then see of the larynx, is really revealed by means of the well-illumined and properly handled laryngeal mirror; and all that is so seen can with care and dexterity be reached with instruments and medicaments. Thus, light is shed, in both the literal and the metaphorical sense of the word, upon an organ which in the uninjured living body was before impenetrably concealed from the human eye—an organ, too, which combines within itself the execution of two functions of the animal economy, of which one is intimately connected with our physical well-being, and the other as intimately with our moral and intellectual state; the former relating to one of the most momentous, if not by far the most momentous function, viz. respiration, the latter being the production of voice,

which in its perfection is one of the grand distinguishing characteristics of humanity! And thus, not only is our most objective and reliable sense—that of sight—brought to bear upon the examination of the organ in its physiological action, and its pathological condition, but direct, i.e. Topical Therapeutics has achieved a conquest by which the boundaries of its domain are unquestionably enlarged.

It is in this respect that the direct benefits derived from the laryngoscope in disease leave far behind those of the stethoscope, microscope, and ophthalmoscope: Looking at naught but our practical duty of knowing and treating disease, while with the stethoscope we may hear, while with the ophthalmoscope we may see, *what there is*, with the laryngoscope we not only see what there is but CAN SEE WHAT WE DO, and "both in diagnosis and treatment its non-employment or employment implies all the difference that exists between the condition of him who endeavors to grope his way in the gloom of the darkest night and that of him who walks securely under the midday light of the effulgent sun."