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SUSPENSION LARYNGOSCOPY AND ITS ACCOMPLISHMENTS.*

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NEW ORLEANS.

Can you imagine the peculiar sensations that must have greeted Prof. Gustave Killian when he viewed for the first time the larynx of a cadaver brought into view by a tongue depressor, placed over the tongue and epiglottis, the handle of which was swung from a support at the side of the table, the subject's head hanging free?

To sit comfortably in front of the open mouth and to view deliberately the larynx, without the "time honored" fatigue of either your arm or that of an assistant, must have created a certain sensation of joy and satisfaction hard to describe. This was the birth of suspension laryngoscopy, some time in the winter of 1909. According to Killian, much experimental work was done until the method was decided to be sufficiently developed for presentation to the laryngologic world at the International Laryngological Congress in Boston, in 1911.

*Candidate's thesis to the American Laryngological Society.

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From this period until the present time the method has been used by laryngologists the world over, and as a natural consequence there began to appear varying views and modifications.

At a meeting of the American Laryngological, Rhinological and Otological Society, held in Washington, District of Columbia, in May, 1913, I saw Dr. Wolff Freudenthal demonstrate the apparatus, and later had the pleasure of viewing the larynx of a case suspended by him, at the Beth Israel Hospital, New York City. I became enthused with the possibilities of the method and purchased an instrument of the latest Killian design.

I began the use of the suspension laryngoscope, and with the increasing acquaintance I dreamed more and more of its possibilities, but at the same time realized that much was lacking in what I had considered a "perfect" instrument. I was soon impressed with the fact that the range of usefulness of the outfit would be decidedly limited unless I were able to view the anterior commissure of the larynx in every case. The children gave me but little trouble, but in adult cases I could not see nearly as much as I desired. Small tumors far forward in the anterior third of the larynx were not in view, and try as I might, I could not adjust the instrument satisfactorily. The "gallows," as Prof. Killian has called it, was not long enough; its attachment to my operating table was not straight or square, its motion horizontally was limited, and many times I felt that if it were only four inches longer I could see ten times better. The hook was frail, and after use on an adult case, would have to go to the instrument maker to be straightened. Then I could not gain space enough through the opening to see well, realizing that a Jackson or a Mosher spatula would yield a much broader field of view. The tongue would slip from side to side, and when in the middle line would so fold around the spatula as to convert the field of vision into a tube whose caliber was too small for any use.

To correct these troubles was now my desire, for it was always plain that the principle as proposed and executed by Killian was thoroughly proper and correct. Taking then my goal of acquirement, the anterior commissure of the larynx with a wide open mouth and an unobstructed view of the parts concerned, I set about to surmount the difficulties as they arose and as they appeared to me.

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I had made a table top from a cypress board six feet long and eighteen inches wide, fixed with clamps to fit my operating table so that it would be perfectly rigid under all circumstances. At one end a section twelve inches deep and fourteen inches wide was cut out, and hinged to drop at right angles to the surface, this leaving a projecting platform four inches wide and twelve inches long, the purpose of which was to increase the horizontal traveling distance of the gallows, by placing the clamp of the gallows forward of the shoulders instead of behind them, as is necessary under ordinary circumstances. Again, the hinged portion did away with the necessity of having to drag the patient over the head of the table after the sterile goods had been placed, and a most uncanny feeling to a patient under local anesthesia. The table top in its original pattern I still use, and feel that it is one of the very essential units for success. A "wabbly" table is a source of trial at all times, and in one instance my patient actually slipped off, falling to the floor because of the nonbalance produced by the extension of the head beyond the table top, and the body weight coming beyond the center of gravity.

The tooth plate of the mouth gag would invariably stick, its movement—only a quarter inch—was entirely too small to suit all cases, and it was always necessary to make the adjustment before being applied. Again, the vertical opening of scarcely one inch was not as long as the mouth would stretch nor large enough for me to see as well as I might. Accordingly, I had constructed the tooth plate and mouth gag described by me at the twentieth annual meeting of the American Laryngological, Rhinological and Otological Society, in Atlantic City. This modification permitted of an increase of one inch in the vertical and one in the horizontal, the latter being controlled by a screw which was more powerful and accurate, and would not stick and jam. I worked with these modifications for some time, satisfactorily I thought, when one day I could not get away from the milled head of the adjusting screw. I could see it all the time, as one must see the black spots in scotoma; then the platform through which the tooth plate traveled would project into the mouth cavity beyond the tooth line, which interfered very much in the dissecting operations; and finally, while suspending a husky farmer of

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about two hundred pounds, it bent so decidedly under the strain, that I felt that it was neither safe nor satisfactory.

Again, the tongue on the main frame to which is attached the various tongue spatula and which acts as a guide for the vertical movements of the mouth gag, and which must bear the brunt of the leverage, was found first of all to be of brass and consequently to bend easily, and this would actually occur after nearly every case of any size. Then the screw which was used to operate the vertical movement of the mouth gag was so small that it was at times impossible to move it at all during the various stages of introduction.

I set about to correct these shortcomings by making the frame of the instrument of the shape of a reversed L, with the screw that operates the mouth gag working through the end of a horizontal branch of the L, the advantage being a large screw head that could be grasped well and that could be moved at will, even in the heaviest cases. The tooth plate was made to extend for nearly two inches horizontally, working by a worm gear joint and swivel near the tip. This placed nothing in the mouth cavity beyond the tooth plate, allowed of a wide opening of the mouth and was thought to surmount all of the difficulties. It was this instrument that was shown at the meeting of the Middle and Western Sections of the American Laryngological, Rhinological and Otological Society at Cincinnati. This whole apparatus proved mechanically wrong, and I have mentioned it for that reason. The center of gravity was not in the middle line, consequently the instrument would pull to the side, necessitating the continuous holding of the head by an assistant. The screw moving the mouth gag was pitched too high and would jam so as to be perfectly immovable because the weight was off center. The worm gear joint could not be made strong enough to withstand the weight, and would bend up so as to give but a small opening to the mouth. I will never cease regretting that it was ever displayed.

The instrument that I have been using for the last six weeks has many points in its favor, and seems to be entirely satisfactory up to this time. One realizes that the main requisite for one instrument to suit all cases and conditions is flexibility. I mean by this a wide range of motion in every possible

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direction, all in excess of what is usually needed, that they may be called upon in the unusual cases.

As my work is done on adults as well as on children, I have felt the necessity for strength and power, to overcome the greater muscle tension met with in most adults. Therefore, the new instrument is very much heavier in all its parts, and is thought now to be able to stand the severest test possible. The main frame is of heavy steel, broader and thicker than the original, mainly to secure a large milled screw used to open the mouth gag in the vertical direction. This has permitted a larger and stronger shaft to the gag, and the thread is pitched lower to give greater power. In addition, the screw is drilled throughout its circumference to permit the use of a lever or handle, as is done in the manipulation of an ordinary jack screw. The mouth gag will now open to a full one and three-quarters inches on the inside, which is much in excess of what is usually required.

The tooth plate of the mouth gag should move freely in the plane of the tongue spatula—a range of motion that is necessary for jacking up the epiglottis and which renders the length of the tongue spatula variable and does away with any projection in the mouth cavity that may obstruct the view. To accomplish this I utilized the principle of a pear-shaped ring attached to the frame, the movement of which is controlled by a thumb screw. By it one can easily introduce the tooth plate well beyond the line of the teeth of the superior maxilla and so move the tip of the tongue spatula at least one and a half inches. This will permit of the use of the shorter spatula and so bring the operator nearer his work. At the same time there is developed a slightly tilting motion to the tip of the spatula, which will tend to elevate the epiglottis well beyond the field of view. Another feature embodied here, and which is an innovation not before mentioned by Killian or others, is the provision of adjustable single or multiple tooth plates. One, two or three can be used, depending upon the size, condition and shape of the superior maxilla under suspension. This feature is of especial service in changing from children to adults and from V-shaped to circular arches. Again, it will permit the fixing of the base of a triangle formed by the tooth plates at two points, the tip of the tongue spat-

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ula as the apex, and thus prevent the tongue spatula from slipping from side to side and losing one's view in the middle of an operative procedure.

Finally, the base to which the tongue spatulas are attached has been strengthened so as to meet the most rigid demand. The tongue spatulas have been modified into the form of a slight curve with fixed flanges, to prevent the infolding of the tongue. Also, one spatula has been made with movable or adjustable flanges, but this is more complicated and has not seemed necessary.

TECHNIC.

Perfect relaxation and quiet are fundamental for the work, and the anesthetic to acquire these satisfactorily in the patient will depend upon the condition requiring treatment.

In children, general anesthesia is by far the best and safest, administered by a trained anesthetist, using some form of warm ether vapor. I select ether always for general anesthesia, using the warm ether vapor as delivered by the Cain-McDermott ether apparatus, or by compressed air as is used at the Ear, Nose and Throat Hospital in New Orleans, and insist upon my patient being kept continuously in the surgical state of anesthesia, instead of being allowed to awaken intermittently, as would be the case in ordinary open cone anesthesia; a most unsafe state for the patient and designed to interfere most annoyingly with the work to be accomplished. The bronchorrhea complained of I have never seen in any of my cases, and so far have had no complications of any kind to tabulate.

My anesthesia has been so perfectly satisfactory that I have never felt the necessity of employing either rectal, intravenous or intratracheal anesthesia as a substitute. With the ether being delivered into the mouth through a tube or mouthpiece by compressed air, the anesthesia is under the perfect control of the operator, who can watch this phase of the work—a source of much satisfaction to me. I do not use morphin and atropin before general anesthesia, for I have no desire to benumb the cough reflexes; then, too, many of the cases suffer some from respiratory obstruction, which the administration of morphin may increase still more.

In local anesthesia for adults of a suitable age, I am accus-

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tomed to administer morphin, grain one-sixth to one-fourth, and scopolamin, grain one one-hundred-and-fiftieth to one one-hundredth, hypodermically, one hour before operative time. Then with the patient sitting, I apply gently first to the uvula and then to the posterior pharyngeal wall a ten per cent solution of cocain on a cotton applicator. This the patient is requested to spit out. The movements of the parts required in this act are sufficient to procure fair anesthesia of the fauces and postpharyngeal wall. This prevents gagging which, once started, is hard to control. I then drop from a laryngeal syringe about ten drops of a ten per cent solution of cocain onto the base of the tongue, lingual face of the epiglottis and hypopharyngeal wall, requesting the patient to hawk and spit immediately, that none may be swallowed. A rest of two to five minutes is taken, then from five to ten drops of the same solution is dropped upon the tongue, and the patient is requested to cough immediately, that the excess be removed, thus obviating the possibility of toxic absorption. With a short period of rest the patient is put upon the table prepared for suspension.

Some form of suction apparatus is an absolute necessity to care for the secretions from the salivary glands, and fluid from the esophagus, also to remove those blood clots which collect upon the posterior tracheal wall as far down as the bifurcation, for picking up fragments of tissue that may be loosened from the grip of the retaining forceps, and to render the operative field clear, reducing the traumatism of sponging very materially—a very important factor in laryngeal work.

The patient ready, we proceed as follows, with all parts except the face covered with sterile goods: The gallows is fixed to the platform of the table top, usually from four to six inches beyond the hinged portion, or forward of the patient's shoulders, so that its traveling distance in the horizontal is markedly increased. The coarse vertical adjustment is lifted to its limit and the clamps securely fastened. All parts are seen to be tight and solid, that no accident or slip may occur from this source.

The patient is so placed upon the table that his shoulders will project about two inches beyond the hinged joint. This will allow for the hyperextension of the head and keep movement of the occiput from being blocked against the table top.

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An assistant standing to the right of the table or crane side, facing the head, holds the head firmly in both hands, being sure at all times to keep the head straight with the body. The hinged portion is dropped and the head is extended somewhat, as is shown in Figure 1.

I usually now fold a piece of gauze over the teeth of the lower jaw and crowd the tongue back into the mouth, to avoid pinching or lacerating the tongue by its pressure on the teeth —an accident which has occurred several times.

A suitable tongue spatula and tooth plate having been previously selected and adjusted, the mouth is opened, the instrument closed, the spatula is passed back over the tongue to reach the postpharyngeal wall. The worm gear joint on the shaft of the instrument is adjusted to an angle to lift the hook end away for the assistant's arm, as is shown in Figure 2. The spatula will now assume the relative position as is shown in Figure 3.

The head is still further extended and held in the middle line, the tongue in the middle line, the tip of the spatula following along the posterior pharyngeal wall, the tooth plate being placed behind the incisor teeth of the upper jaw, and the hook adjusted into one of the notches of the traveling crane, as is shown in Figure 4.

A firm hold is maintained on the instrument at all times, that it does not slip from side to side, and all movements are kept in full view at all times.

Now the tooth plate represents the fixed point of the instrument, the tip of the tongue spatula, the movable point, and by turning the screw that moves the ring to which is attached the tooth plate, we succeed in driving the tip of the spatula further into the mouth along the hypopharyngeal wall under the epiglottis, which procedure I have nicknamed "jacking of the epiglottis." The patient's head now hangs free, but a firm hold is maintained upon the instrument, that no movement may displace it. I call your attention to the plane and position of the spatula, as is shown in Figure 5.

The tip of the spatula is shown in Figure 6.

One can usually see now the pyriform sinuses, the opening of the esophagus, and the esophageal surface of the arytenoids. (Figure 7.)

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The teeth are here examined, and if the lips and tongue are not pinched, the patient's general condition is noted for comfort and safety.

The worm gear joint on the shaft is now straightened, which will have the effect of lifting the tip of the spatula toward the epiglottis, and of swinging the head into extension, but I do not carry this movement as far as Killian, for I do not have the transverse portion of the crane to overlay the tip of the tongue spatula, as Killian suggests. (Figure 8.)

The horizontal movement of the crane is used to assist in tilting the tip of the spatula upward, that I may still further straighten the road to the larynx and gain a wider field of view, as is shown in Figure 9.

At this moment usually all is in fine view but the anterior quarter of the larynx—tonsil pillars, palate, uvula, hypopharyngeal wall, pyriform sinuses, mouth of the esophagus, arytenoids, posterior three-fourths of the vocal cords, trachea to bifurcation, etc. To gain the anterior commissure, the vertical movement of the crane is utilized to swing the head free of all support, and in some instances even the shoulders are lifted by this movement. Then the crane is moved horizontally and the epiglottis jacked a little more, until finally we see the anterior commissure of the larynx standing well before us, as is represented by Figures 10, 11, 12.

I must call your attention to the marked differences in the two positions, as pictured by Killian and myself. In the former instance, the crane occupies a position far below the patient's head, the transverse portion of the crane must overlay the tip of the tongue spatula, which will bring the spatula in a perfectly straight line. Since we know, as proven by Jackson and others, and as is shown very nicely by Iglauer in a radiograph in the *Laryngoscope* (June, 1913), that the larynx and trachea do not proceed in a perfectly straight line into the chest, but go downward and backward, a perfectly straight line view will not show the anterior commissure in those cases where marked muscle development is present. While in my position, by gaining marked tilting of the tip of the spatula, this muscular tension is overcome and you can acquire a view of the anterior commissure in those cases not otherwise possible.

By referring to Figure 13, Killian's position, the relation of

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crane to head and tip of spatula will be noted, also the spatula is seen to occupy a straight position in the mouth, which will not show the anterior commissure. In this case, under suspension (a cadaver), the position of crane hook and spatula, as shown in Figure 14, is the one assumed by me in most instances. The spatula tilted up at its tip, pressing the epiglottis forward to the hyoid bone, as can be seen from the angle of frame of hook, also the straight line assumed by the neck, which I believe is necessary to see the anterior commissure and which is absolutely necessary in adults and rigid cases. As the case is suspended, the anterior commissure can be seen perfectly well, and in this position it is possible to do any of the intralaryngeal operations.

In Figure 15 I have attempted to photograph the view of the larynx as is shown in Figure 14, a small tungsten lamp being placed inside of the mouth and the picture taken with the camera that I used in the other illustrations. While the photograph is not quite clear enough to study the anatomy of the part, the cords, both false and true, and the anterior commissure can be recognized. I call your attention to the view obtained and the advantages of this instrument over the others now in use: First, the broad ring to which is attached the mouth gag, brings the pressure in the middle line and balances the instrument in place, at the same time removing every part of the instrument from obstructing the view of the mouth cavity and parts beyond. No screw heads either to the side or in front attract the attention of the eye or furnish a projection upon which instruments, gauze, etc., may catch during operative work. Again, the ability to open the mouth wide and the large lateral measurement, will permit of the free use of tubes, both bronchoscopic and esophagoscopic, in conjunction with this instrument.

The use of multiple and adjustable tooth plates which are here possible will give additional service in procuring the proper view, besides being adaptable to various mouths, teeth, etc.

In cases where the epiglottis is made up of very thin cartilage, the structure falls back against the postpharyngeal wall, and when caught up by the spatula will bend backward and form a roll that will obstruct the view of the anterior

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commissure, or when that organ persists in slipping from the hold of the tongue spatula and falls like a curtain over the view, or, as occurs sometimes, it rolls under the spatula and folds with its free edge towards the larynx. When it is kinked near the cushion, I have found that driving the epiglottis straight with two bridle sutures placed on either side of the middle line, as is shown in Figure 17, will straighten out all these irregularities. The spatula is introduced along the base of the tongue until the epiglottis is seen and held in this position while the two bridle stitches are placed, then the spatula is removed, and while the tongue is crowded into the mouth, tension is made upon the sutures, drawing the epiglottis straight. The spatula is then introduced as described, and the sutures will lie then between the tongue surface and spatula. If the pressure here is not sufficient to hold them in place, I tie them to the frame of the instrument.

In introducing the spatula, if the tongue should slip to one side and heavy extension is made, one is liable to tear the pillars of the fauces on the side of greatest tension. If force is used in sliding the spatula along the postpharyngeal wall, a bruise or laceration may be produced in this region. The tongue should be kept in the center.

In the mouths of old people, where the teeth are brittle or carious or uneven, one may have trouble in finding a suitable base for the tooth plate to rest against. My adjustable tooth plates will correct this, or some form of dental mould can be made to distribute the pressure along the upper jaw. A rubber tube split longitudinally and slipped over the teeth will keep them from harm; likewise a small roll of gauze placed between the teeth and the tooth plate will not slip, and will relieve the pressure of the metal against the teeth.

By following the advice to pull the tongue out of the mouth at the beginning of the introduction of the spatula I have bruised it many times. This can be overcome by crowding the tongue back into the mouth and placing a roll of gauze between the under surface of the tongue and the inner aspect of the teeth of the lower jaw. I do not pull the tongue forward at all now—it finds its way forward too many times. Hematomata and lacerations may develop at the tip, which so far have amounted to nothing except for the soreness and inconvenience. They usually subside within ten days.

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Before removing the instrument from the mouth the secretions accumulated in the cavity of the hard palate and in the nasopharynx should be removed by the suction apparatus. If not, when the head is replaced on the table top the fluid will flow back into the anesthetized larynx and may upset the patient considerably by choking, etc.

A part of the work done under or by the aid of the suspension laryngoscope can also be done by either the indirect method with mirror, etc., or by the aid of one of the direct spatula or tubes now in use. To sum up in one word the value of suspension laryngoscopy, I should say it induces accuracy. It is quite true that pedunculated tumors of the vocal cords can, have been and are being removed by the mirror and forceps, but the procedure is a tearing one every time. This cannot be compared with the accuracy that accompanies the procedure of picking up the tumor mass with a pair of forceps and dissecting it from its base with a knife or scissors.

Papillomata have been removed time and again through a straight tube or spatula, but they always recur, and one is tired long before the larynx is clear, and the papilloma have recurred almost before the instruments are clean. On the other hand, I report fourteen cases removed by dissection, each in one sitting, and none has recurred to this time. St. Clair Thompson reported his brilliant result of the removal of an intrinsic malignant growth from the larynx. The operation was a "tearing" one, as described by him. I have four to report, of removal by dissection wide from the growth, with no recurrence up to this time—the oldest being nearly two years.

Cauterization of the larynx for tuberculosis that cannot be done except by the most skilled, can be done far more accurately and with less pain by one not so skilled, aided by suspension.

I have destroyed two rather large squamous celled epithelioma involving the hypopharyngeal wall near the mouth of the esophagus, by the "Percy" method of cautery. The cases are now free from return and the surfaces cicatrized. This would have been perfectly impossible without the aid of suspension.

Intubations can be done, foreign bodies removed, abscesses

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opened and radium accurately placed and maintained. Parts can be inspected that have never before been seen—namely, the under surface of the vocal cords and the ventricles of the larynx—by the use of my "tilting mirror." Finally, stitches can be placed in any part under view, and all operative work can be carried on in a thoroughly surgical and scientific manner, as is practiced upon the skin surface. The work is at all times in perfectly full view of the operator, and he is free to be as accurate as possible in every move, sitting comfortably with both hands, not even a tired muscle strained or assistant to worry about.

In reviewing my work with the suspension laryngoscope and the dissecting instruments, I am struck forcibly by three facts: 1. The ease of acquiring the technic—in fact, the technic is acquired during hospital life and under the early instruction in general surgery. 2. The absolute accuracy and deliberation with which one works, having both time to think and to act without the fear of losing the field, as occurs in the indirect and direct methods. 3. The very mild amount of reaction that occurs after what would seem the most unwarranted abuse of such a structure as the larynx.

In proceeding with the surgery of intrinsic growths, preparation to work may be made in this way: The patient is suspended and is perfectly quiet and comfortable, or as nearly so as possible, under either local or general anesthesia. The larynx and anterior commissure of the vocal cords are in full view, all parts are fixed and the field well lighted either by head mirror, Klar, Kirstein attachable or detachable electric lights. The larynx is tested with a cotton mop of ten per cent cocain, and if slight reflex occurs, the mucous membrane of the larynx only is painted until all local sensation is gone. In some cases it will be possible to inject cocain or novocain with my extension syringe into the tissues of the larynx for anesthesia. Once anesthetized, the surface is painted or scrubbed gently with argyrol solution, twenty per cent, or pure alcohol, that it be rendered as nearly clean surgically as possible.

Vocal nodules are picked up carefully and examined to be sure that nothing but nodule is in the forceps, when the small tumor is carefully cut from its base.

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Pedunculated tumors are treated likewise, their point of attachment being sought. It is striking how many grow from the loose area just under the vocal cord, instead of from the vocal cord itself, as appears upon indirect examination. Here the cord is lifted up or turned back so that the attachment can be seen and the tumor removed with its base included, the raw surface remaining being either covered with the compound tincture of benzoin as a dressing, or stitched, as was done in one case by me, where the raw surface was unusually large.

In papilloma I have found my greatest pleasure in the fact of being able to remove them completely at one sitting, without recurrence. Some of my cases are over a year old and have not recurred as yet, and are still under observation.

Inasmuch as papillomata of the larynx differ in no way from those on the skin or other mucous membrane surfaces, why should they recur so persistently in this locality as against all others? It would seem the only answer is, incomplete removal. Why should this be? Because we have never before been able to operate with anything but punching or pinching forceps, neither of which will remove completely a papilloma from its base.

I have had fourteen cases with no recurrence in any instance. The first case, operated on in July, 1913, is still free from papilloma, has a very good voice, and is perfectly well. I referred to him as "Buster" in the article before the American Laryngological, Rhinological and Otological Society, June 19, 1914. The case referred to in the same article as "D. B." has an interesting history. After the removal by dissection in August, 1913, she returned home, and remained well until February, 1915, when she returned again to the clinic with some hoarseness. I was sure, upon hearing her voice, that now I must tabulate my first failure, when upon examination I found that there was a small papilloma developed beneath each vocal cord. I remembered that no papilloma was found beneath the vocal cord at the operation, and in looking into the larynx the parts above the cords were perfectly free, while just beneath the cord these two small weak looking masses appeared. I removed them by dissection, and she has since had no return of any kind.

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For papilloma I proceed by picking up the growth with a hook or mouse tooth forceps, planted as near the base as possible, and dissect cleanly well beneath the growth, taking care not to injure muscle tissue, so as not to limit the function, if possible. After dissecting clean all the involved surface, the base is scraped thoroughly with a spoon curette and the raw surface left swabbed with pure alcohol.

I have never given arsenic or used radium or any other agent to retard the growth; I depended on my dissection, as I was anxious to be certain that the lack of return was to do nothing else but clean dissection.

I have removed four malignant intrinsic growths of the larynx, one spindle cell, the other squamous cell epithelioma. My first case, referred to at Atlantic City meeting as "Mr. B.," is still free from any sign of return, is hard at work and enjoying good health.

"Joe C.," colored, was operated on by my method in June, 1914, tumor occupying the anterior half of the right vocal cord, extending to the commissure. He is a professional singer in negro vaudeville, and weighs about one hundred and ninety-seven pounds. With suspension under local anesthesia I removed by dissection down to the cartilage the anterior third of the left vocal cord, the right cord back to its vocal process, and the tissue for about one-half inch on the cricord below the vocal cords. His recovery was very rapid and complete, and he now has a moderately fair voice (not singing) and is so far without recurrence.

"Mr. H.," operated on in January, 1915, and "Mr. T.," in March, are too recent, except to say they have both healed nicely and are at this minute healthy and well (April 20, 1915).

The cases of malignancy of the larynx suitable for this procedure must be carefully selected. The tumor must be purely intrinsic. If the joint has been fixed for some time and the history that of a fairly rapid growth, I would hesitate to use the method. If the arytenoid is edematous and a progression here is feared, if it would seem to extend subglotically to the cricothyroid membrane, or if cervical glands are palpable, then I would not select this method.

All four cases were practically well on the fourth day after

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the operation, there being no temperature or any symptoms that gave the least amount of concern. In none has there been the slightest disposition to edema or stenosis at any time —in fact, I am still surprised at the practical absence of inflammatory reaction. I believe the possibilities of recurrence are lessened here, because of the fairly sterile field under which healing takes place, with no external wound or separation of the thyroid or cricoid cartilages. It has been through this pathway that my thyrotomy cases have recurred. I have not had a sufficient number, nor sufficient time to formulate anything that would be more than a mere personal thought.

I have destroyed by the actual cautery two squamous celled cancers growing from the mouth of the esophagus, both tumors occurring in men of about seventy years of age, one a negro, the other a white man. In one the tumor involved the posterior surface of the arytenoid, and was beginning to go down the esophagus. Under suspension, with the mouth wide open and a current of air playing in the mouth and the suction carrying off the smoke, and assistant's hand on the surface of the neck guarding the temperature through the skin, I proceeded to burn through the growth in all directions, after the method of Percy, being careful that the temperature was not sufficient to char the tissues, but enough to turn them to ashy white. The sitting required about fifty-five minutes. The patients went through their convalescence nicely and are still free from recurrence. Both are still under observation and will furnish material for a later report. These cases were done in the early part of December, 1914. I think this is the first reported instance of this method under suspension, and in dealing with tumors this way. In the case of a pedunculated epithelioma growing from the postpharyngeal wall, just above the arytenoid cartilage in an old negro man of about sixty-eight years, I dissected the tumor free from its attachment well below its base. There was left an open surface of one and one-quarter inches long and about half an inch wide, which I closed nicely by fine catgut sutures, using the smallest Lane needle and No. 0 plain catgut. This was done in November, and the patient is still well.

The immobility of the larynx under suspension renders the operation of cauterization of tuberculous ulcerations accurate

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and certain, without danger of destroying healthy tissue. I have operated on four cases of this type with uniform good results, relieving pain, adding to the comfort and prolonging the life of the patients.

I have removed a peanut from the bronchus of a baby fourteen months old, under suspension, with my speculum for separating the vocal cords. I removed a few masses from the trachea, and a large part of the kernel impacted in the right bronchus. It required no anesthetic nor a tube for this work.

Suspension was used in the removal of an open safety pin from the esophagus of an eleven-months-old child. The clasp, imbedded point upwards behind the cricoid cartilage, was caught with one pair of the baby forceps, the spring end with another, and the pin rotated so as to lie with its point downward towards the stomach, changing hold the forceps from the clasp end, now caught the point side of the shank and bent it in so as not to catch the side wall. The spring end was then brought up and out, with the point guided by the other forceps so as not to injure the wall of the esophagus. The child recovered nicely.

A young boy who received a blow on side of the neck suffered a fracture of the thyroid cartilage. I saw him some weeks after, with aphonia, dyspnea and a palpable fracture. Under suspension I was able to see a large granulation protruding into the larynx from the side of the fracture. Both cords were movable, but very red. I removed the granulation and placed an intubation tube in the larynx to fix the fractured plate. This was worn for about six days. Upon its removal the crepitus previously felt in the cartilage was gone and he breathed well.

Laryngology was born when Garcia discovered the laryngoscope, it bowed slowly to Kirstein when he saw directly into the larynx with his spatula, and it is now bowing again to our master of laryngology, Prof. Gustave Killian, when we are able to sit and view the larynx under suspension with both hands free to work.

While we all realize the infancy of the procedure, and are groping widely for its advantages and limitations, we cannot but think that the old must give way to the new method of attack, and I am certain that we will begin to change our

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opinions, in proportion to the field of view and the possibility of its accomplishments.

I submit to you this, "A review of my efforts to place the apparatus, its principles and accomplishments, upon a firm foundation, a procedure established, true, but requiring much work yet to give it its proper status in our scientific attainment."

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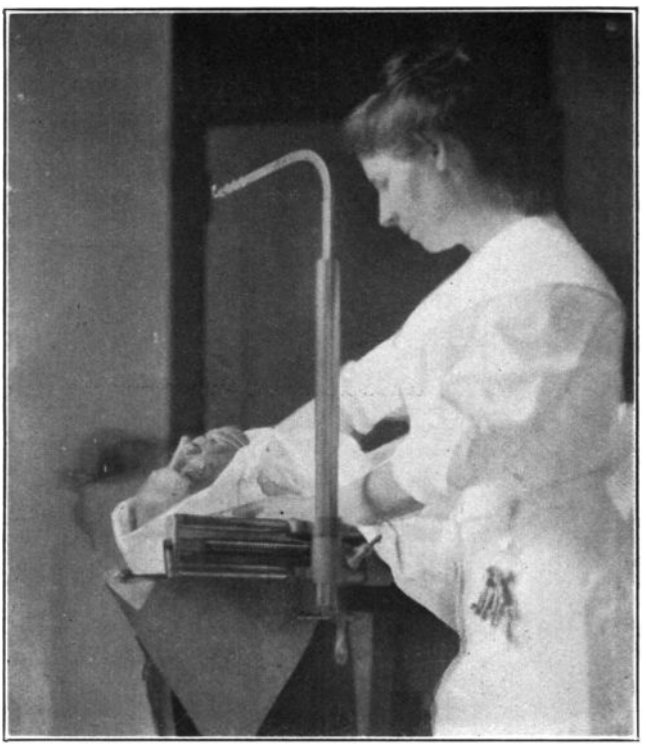


FIGURE 1.

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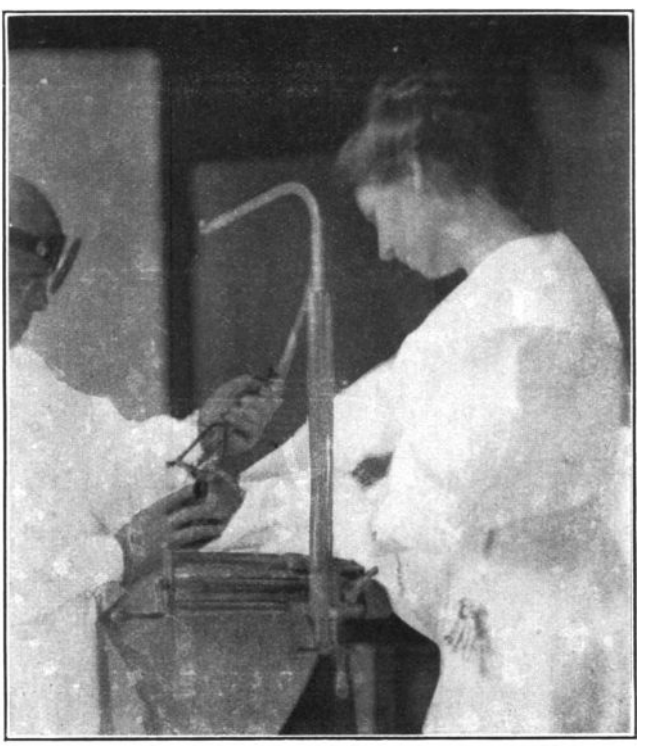


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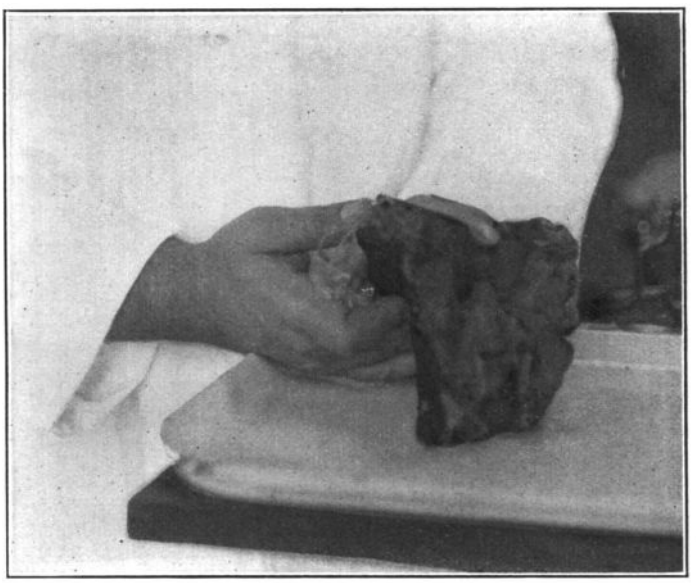


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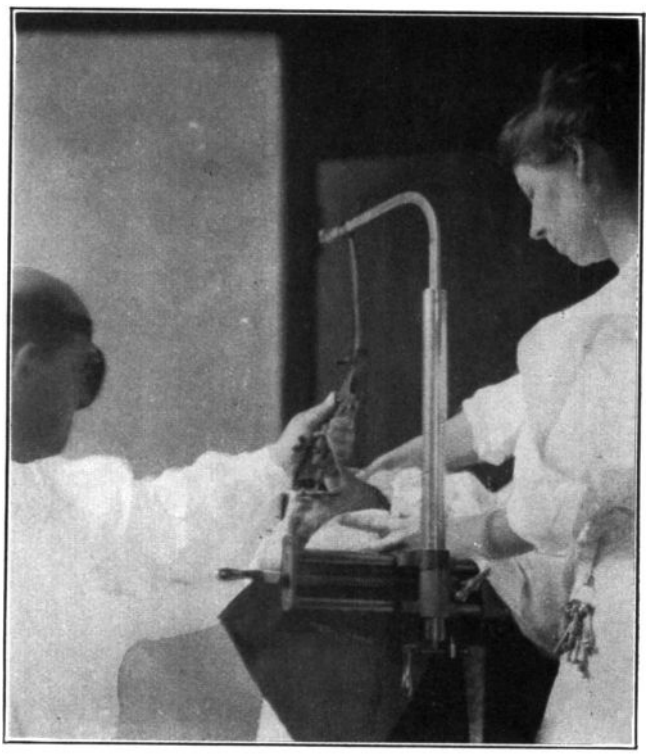


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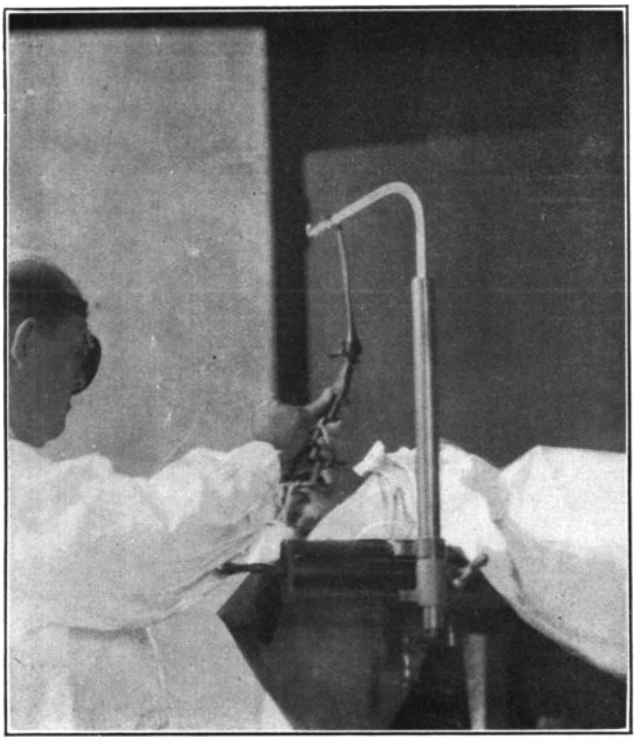


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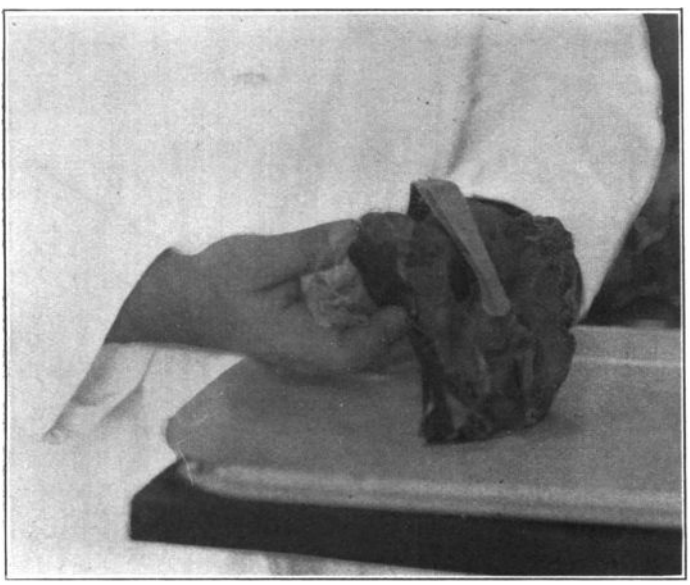


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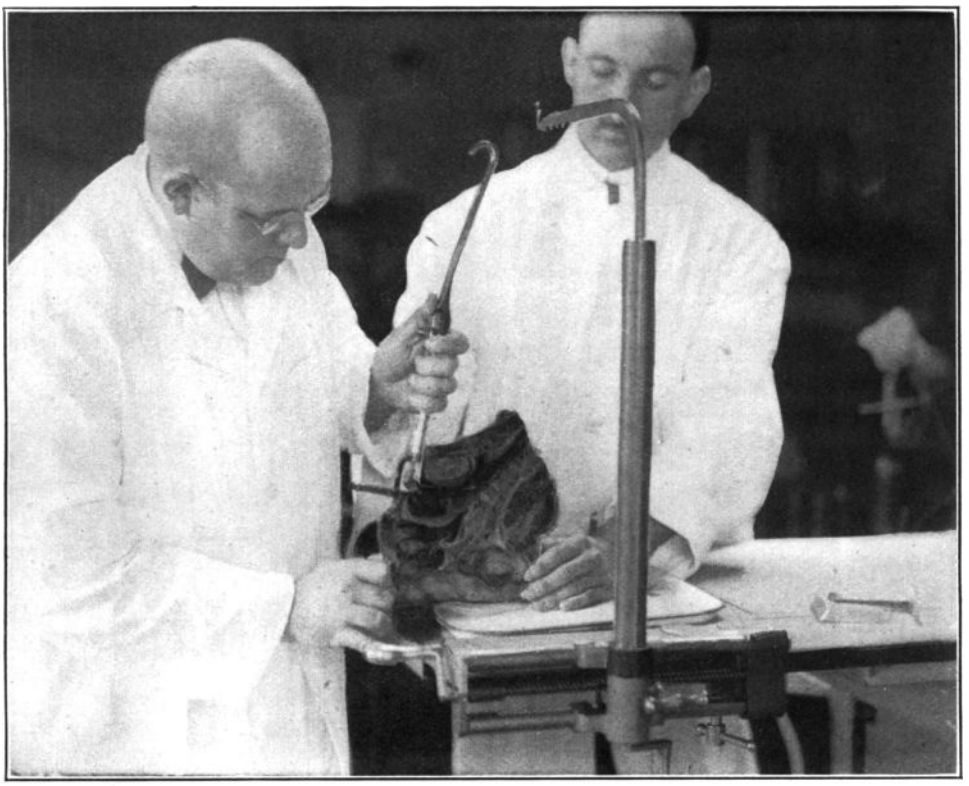


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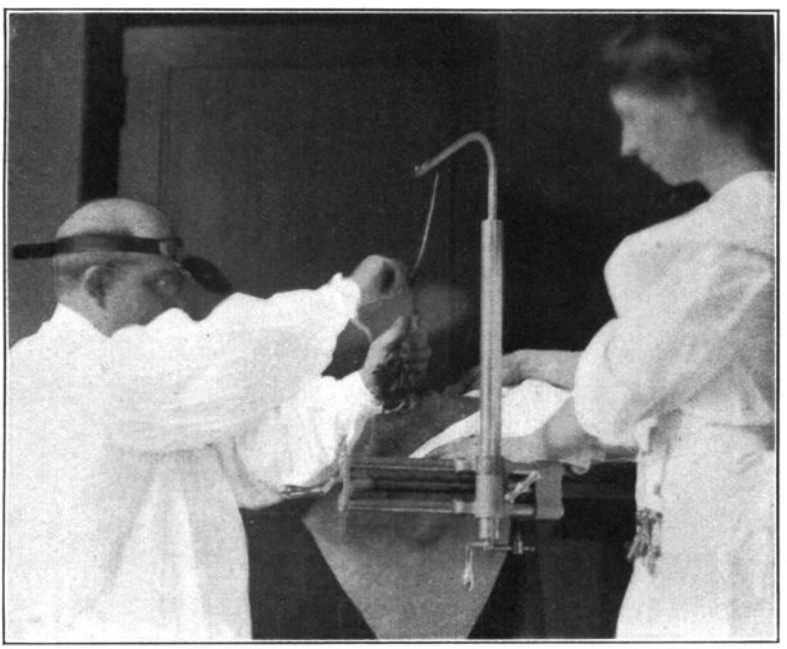


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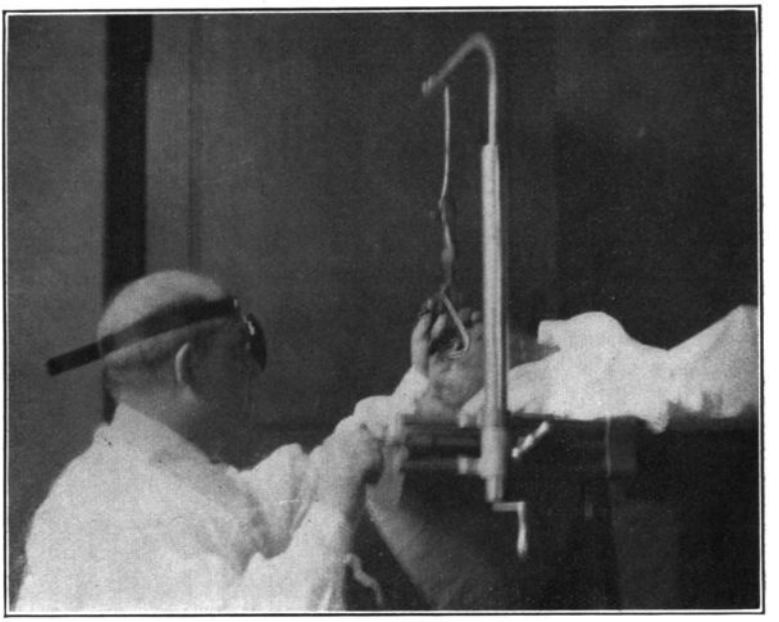


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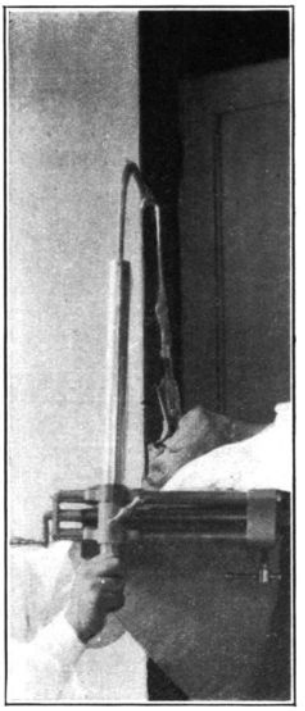


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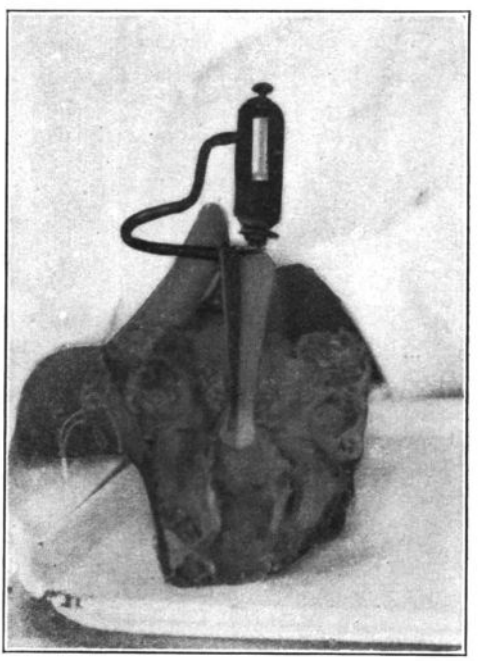


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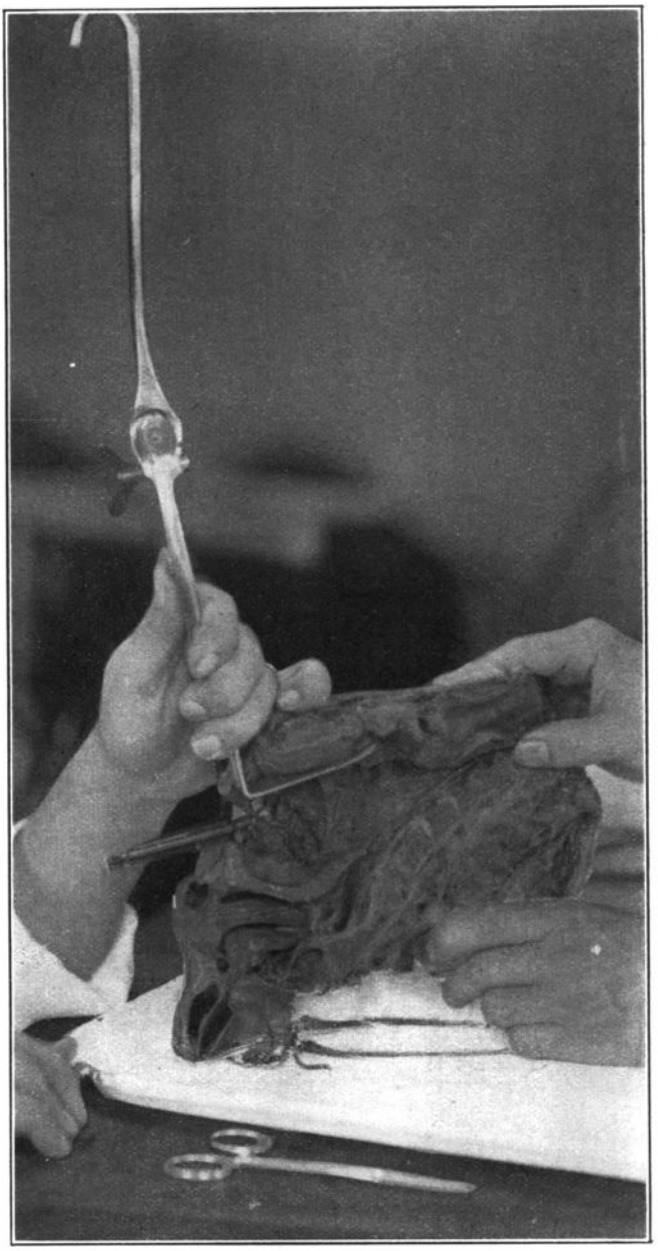


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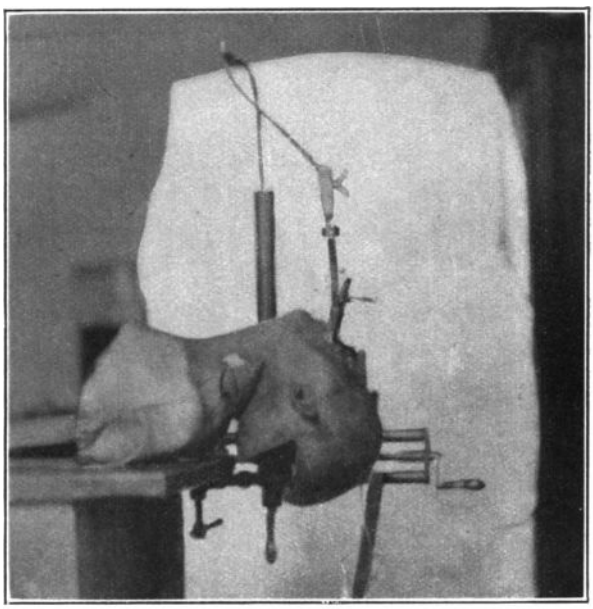


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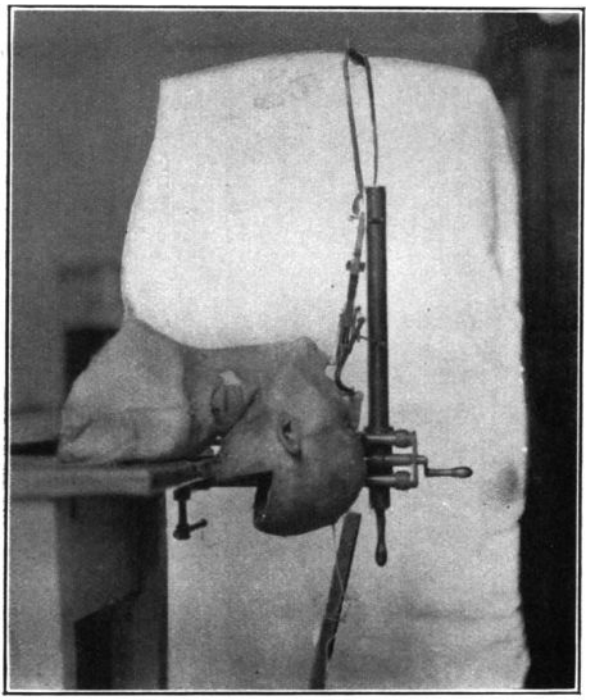


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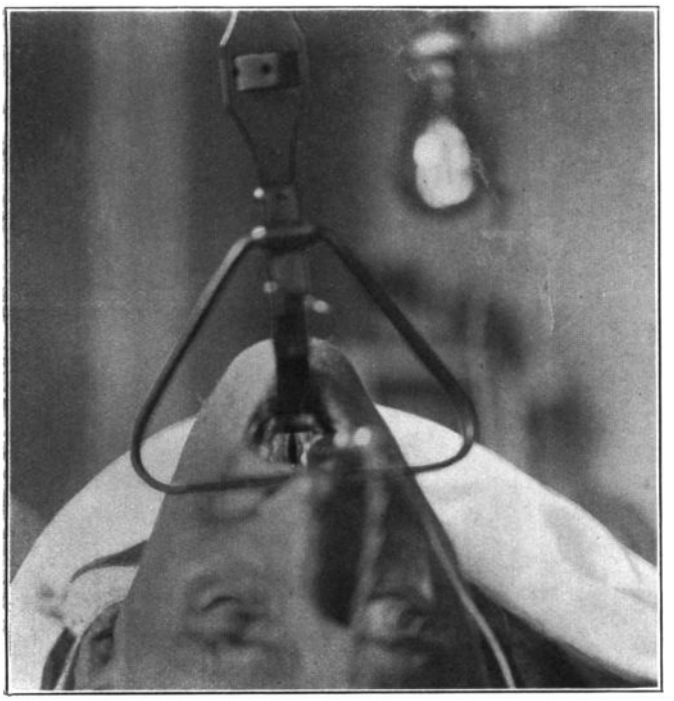


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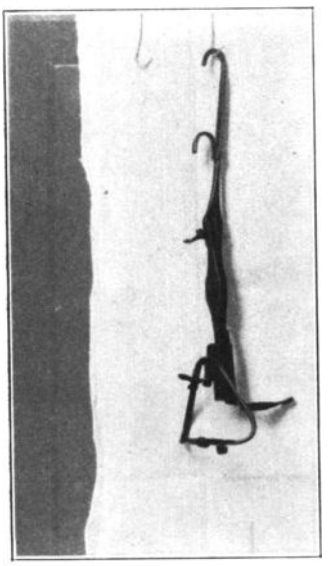


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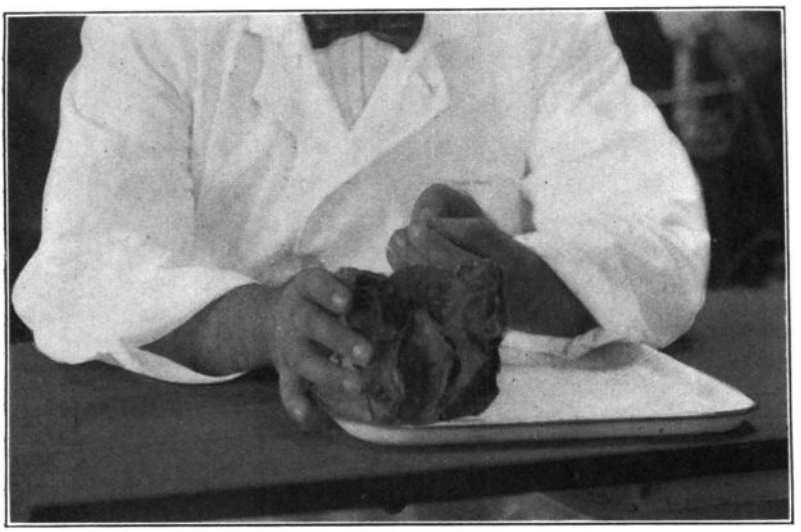


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