ting posture. The apparatus may be considered essentially labour-saving, since it combines, in a compact form, all the materials for the washing and dressing of the wounds, and removes all the refuse from the words.

At the Wills' Hospital, several years ago, I had flowing water, upon a simpler plan, introduced into the dispensary and operating rooms. By this method the brushes and sponges used in making the various applications to the eye can be more rapidly and thoroughly cleansed.

In the surgical wards of the Pennsylvania Hospital, this apparatus and method of cleansing wounds has been in operation for several months, and has given entire satisfaction.

NOTE.—Since the above was in type, I have found, in looking over the *Lancet*, just received at the Hospital, *Observations in the Military Hospitals of Dresden*, by Alex. Bruce, F.R.C.S., in which article reference is made to "irrigators employed in washing out the wounds, and especially the long sinuses left by the tracks of the bullets" as being of great value.

"They simply consist of a tin vessel, with an aperture near the bottom, to which is attached an India rubber tube with a bone nozzle."

"By means of this contrivance a continuous stream can be made to play over the wound, and thus effectually wash out the sinuses without the use of the sponge. I regret to say that the latter were, however, in far too constant use, and, as servants can never be got to attend to precautionary measures, these sponges were frequently carried from patient to patient, necessarily often loaded with the very poison of pyæmia."

Thus the continuous stream of water for cleansing purposes has been found of great service in the military hospitals at Dresden, but any good which might arise from this arrangement is entirely done away with, from the fact that the most uncleanly practice of using the same sponges in many cases was followed by most disastrous results; for, as Dr. Bruce remarks, "I cannot but attribute much of the very serious pyæmic epidemic from which we suffered to the want of sufficient caution in small matters of this nature."

1421 CHESTNUT STREET, November, 1866.

ART. X.—*Case of Aphonia successfully treated by the Extirpation of a Fibro-epithelial Neoplasm from the Vocal Cords.* By EPHRAIM CUTTER, M.D., Boston, Mass. (Read before the Middlesex, Mass., East District Medical Society, July, 1866, and, by its particular request, published as a communication from that body.) With five wood-cuts.

SEPTEMBER 14, 1855, I was consulted by Miss Anna M. Jewell, of Pepperell, Mass., 28 years of age; school teacher. For the last five or six years her labours had not been excessive. She had always been well, until the present difficulty of aphonia, which commenced in September, 1862, with a cold and hoarseness as the primary symptoms. At first this hoarse-

ness appeared in the morning, disappearing during the daytime. There was no soreness, dyspnœa, dysphagia, or severe cough. She was hoarse both in and out of school, could talk aloud with an effort, and sing until September, 1864. In the spring of 1865 her health became so much impaired as to oblige her to give up her school. Still, besides the aphonia, there was little apparent disease, save a general weakness, loss of appetite, and troubled sleep.

She had previously received the advice of a number of medical men, but at this time was under the care of Dr. Miles Spaulding, of Groton, Mass. He treated the case judiciously on general principles, employing topical remedies, such as the nitrate of silver, iodine, &c. The patient not being relieved, Dr. Hitchcock, of Fitchburg, Mass., was called in consultation, who recommended disuse of voice with an appropriate general and local treatment. The aphonia increasing greatly, the patient was referred to the writer for a laryngoscopic diagnosis, there being, however, no suspicion of there existing any new growth in the larynx.

Her appearance on September 14th, 1865, was that of blooming perfect health, with a cheerful, lively disposition. She complained only of complete loss of voice. Her physician, Dr. Spaulding, spoke of her loss of strength, tendency to anæmia, loss of appetite, and enfeebled condition.

On physical exploration by laryngoscopy with reflected sunlight, a neoplasm, extending across the vocal opening from right to left, was immediately disclosed. It appeared, at the first examination, near its thyroid insertion on the right vocal cord, as a sessile, oblong, bluntly digitate tumour of the size of a split pea. It was white, or of a pale light red, according as the growth was compressed between the vocal cords, or liberated from their grasp by the opening of the glottis. At this first examination it was only possible to decide the presence of the tumour. There was great difficulty in the exploration from intractability of the tongue.

26th. The examination was repeated, with results which entirely confirmed the former diagnosis. At this observation the sessile nature and cauliflower character of the growth were also well made out, and shown to Dr. Spaulding.

It was seen to be a sessile tumour, involving the thyroid half of the right vocal cord, and was thought to be non-malignant from the absence of pain and its benign aspect.

In relation to treatment, it was positively asserted that it could be removed by surgical measures—that this removal could be effected either, first, by laryngoscopic surgery, after a thorough preliminary edentation of the tongue and throat, which would involve considerable time—or, second, by its ablation by laryngotomy, with the advantages of speedy and complete removal and no loss of time. It was proposed to leave the decision of the operation to the patient, who was a lady of great refinement, capacity, and intelligence—we rather advising the external operation. The patient, following the natural aversion to the risks of having one's throat cut, decided to select the former course, with laryngotomy as a reserve. She returned home with instructions to repeatedly introduce foreign bodies into her throat, such as the fingers, spoon handles, ivory-tipped whalebone bongies, &c., in order to educate the throat to the tolerance of their presence.

In October she came under personal supervision for about ten days, during which time she was exercised in manipulations of the tongue, position of head, and various kinds of illumination, in order to render the

parts tractable and fully expose the tumour. At the expiration of this interval she returned home, having made quite commendable progress. Her difficulty was not in nausea or intolerance of the instruments or manipulations, but in a persistent, upward and backward position of the base of the tongue, its convexity accurately fitting into the concavity of the arch of the soft palate, thus occluding the view.

Circumstances prevented the renewal of the treatment until December, 1865. She was daily practised upon till the education seemed complete enough for the practice of surgical interference.

In the mean time the seat and optical characters of the whole tumour were completely made out. It proved to be a sessile tumour, its seat ex-

Fig. 1.

APPEARANCE OF THE GROWTH IN LARYNX BY LARYNGOSCOPE.—1. Epiglottis. 2. Arytenoid cartilages. 3. Neoplasm, covering the whole upper surface of the right vocal cord. 4. Do. on left vocal, leaving the arytenoid half uncovered.

tending over the whole upper surface of the right true vocal cord and the thyroid half of the left true vocal cord. Its surface was divided up into a large number of subglobose protuberances or bosses of varying size.

From its non-pedunculated character, it was proposed to remove it by Leiter's laryngeal forceps, with a double blade, modified from that furnished with the instrument which is adapted to pedunculated growths springing from the sides of the larynx, having the cutting edge on its lateral surface. The one contrived has a cutting edge on its bottom surface, much like the common tweezers (Fig. 2). This instrument closed would

Fig. 2.

Dr. Cutter's modification of sessile forceps, adapted to the removal of sessile growths.

be introduced into the larynx guided by the mirror and put in contact with the tumour. Then by relaxing the spring, the blades could be opened, and the tumour seized and portions avulsed by closing the spring and removing. Sometimes the grasp was so firm and the force applied to the growth so great that it could not be brought away without danger of breaking the instrument. The applications were conducted once or twice daily. As time was not a matter of consideration, the sittings were not protracted beyond the beginnings of nausea and retching, which almost always resulted. Some pieces were removed at almost every sitting, in all amounting to perhaps one-third of the bulk of the tumour. Other contrivances for the removal of the growth were employed, such as the Leiter's knife and Semeleder's sickle knife, besides various shaped knives of the author's invention. The difficulties with the tongue all this time were very great. It proved to be, indeed, a large, rigid, and unruly member. Spatulae of various sizes and shapes

were tried without success. The persistency with which the tongue approximated the soft palate as well as the posterior pharyngeal wall was surprising and vexatious. Another difficulty was the general prone condition of the epiglottis. The best contrivance resorted to for obviating these difficulties was the inducing laughing, a condition in which the throat becomes open. When the patient was made to laugh, the tongue descended and the epiglottis became erect, and a good view could be obtained and then a portion could be removed. There was an unexpected difficulty in this case; her throat-education, instead of improving, rendered her tongue more unmanageable. So that notwithstanding a large portion of the polyp was removed February 3, 1866, and another large piece on the 9th, by the 14th the throat became so exceedingly irritable that it was impossible to secure any but the most unsatisfactory views, and the patient was advised to return home and afford rest to both herself and physician.

On her return three weeks afterwards, she complained of pain and weakness in the upper third of the front of her chest, and of an indescribable uneasy feeling of an insufficient supply of air. The aphonia was about the same. On laryngoscopic inspection the polyp was found to have increased in size, filling up more than one visible half of the larynx. It presented the aspect of a whitish cauliflower excrescence, deeply and irregularly indented into subglobose masses, presenting somewhat the appearance of a compactly pressed bunch of small grapes. It was sessile, and its base was attached to the whole upper surface of both vocal cords, except aryteoid half of the left vocal cord. The tongue had not improved in its tractability by rest, and it seemed as if it never could be tamed. It was then decided to remove the growth by laryngotomy, for the following reasons: 1. The size and sessile nature of the tumor. 2. The inability to obtain at will, successful and protracted views of the neoplasm. 3. Its rapid increase, threatening the viability of the patient. 4. The certain prospect of the immediate and complete removal of the growth, and consequent expectation of the more speedy recovery of health, if not of voice. 5. The benignancy of the neoplasm, implied from its appearance to the naked eye; the entire absence of pain, and the microscopical characters of the parts already removed, viz., simple connective fibres in the deeper parts and aggregated pavement epithelium at the peripheral portions.

The operation was advised more to save life than voice. In case the growth recurred the operation would be justifiable as exhausting measures of human interference.

March 30, 1866. The polyp was removed by laryngotomy at the farm residence of Mrs. R. Jewell, Pepperell. As the locality was remote, I provided myself with the following instruments and medicinal agents: *Scalpels*, with curved and straight edges; *bistouries*, sharp and probe-pointed, straight and curved; *forceps*, artery-carved, dissecting, dressing, laryngoscopic, polypus, self-closing, and self-fastening; *scissors*, straight, curved on edge and sides, and hawks-hill; *directors*, *curettes*, one silver tracheotomy tube; two double tined blunt hooks; two single tined toothed and antoothed hooks; some peculiarly shaped knives on curved terminations

Fig. 3.

Portion removed by laryngoscopic surgery—in vial. (Natural size.)

accommodated to the concavity of the larynx both sides; one of Smith's watch-spring tracheotomy dilators; *needles*, straight, carved, and three sided; silk and cotton ligatures, sticking-plaster; two of Charrière's finest pocket cases, embracing a large duplication of first class instruments. One pound Squibb's ether; one pound common ether; chloroform $\text{℥}\text{iv}$; persulphate of iron $\text{ʒ}\text{ij}$.

The day was clear, cool, and airy. At 10.15 A. M. the operation was commenced by administering ether on a sponge placed in the apex of a loosely-formed cone made of a common newspaper. A contrivance that worked admirably, and I believe was suggested by Dr. Spaulding. There were present Drs. Miles Spaulding, of Groton; George F. Shattuck, of Pepperell; George M. Howe, of Framingham; and W. A. Webster, of Groton.

The patient was placed in a low wooden, old-fashioned arm-chair with the front legs elevated about four inches. The back of the chair reached to the shoulders so that the head could be easily bent backwards. When the patient was completely etherized, steadying the parts with the fingers of the left hand, I made, with carved bevelled scalpel, an incision in the median line, about three inches in length, from the hyoid bone downwards, cut carefully through the fat to the fascia which was elevated by the forceps, nicked, a director entered, and the parts cut with a sharp-pointed bistoury. Then with director, knife point and handle, and fingers the tissues were cut, and retracted from the median line, until the hyo-thyroid membrane, the thyroid cartilage, the thyro-cricoid membrane, the cricoid cartilage, and the three uppermost rings of the trachea with their membranous interspaces, were fully exposed. The exposure of these tracheal rings was made, so that, in case it should become necessary, the tracheotomy tube might be early introduced by simply separating the lower part of the wound and incising the trachea.

It was deemed proper by myself to abandon the use of the tube, if possible, on the principle that foreign bodies in the air-passages should be avoided, and also from the consideration that the new growth when removed would leave more space for the air than there was before the operation. In case of dyspnoea from inflammatory exudations, the introduction of the tube would be easy. As it happened, the tracheotomy tube was not even required to be used at all.

When it is understood that it is the approved custom of surgeons in like cases to perform tracheotomy and introduce the tracheotomy tube for twelve or fourteen days previous to the performance of laryngotomy and the removal of the growth, the particular significance of this modification will be made to appear. It avoids two operations, takes less time, and in this case would have been absolutely unnecessary.

At this stage the crico-thyroid artery was tied. There was no sign of the isthmus of the thyroid gland. Some ten or fifteen minutes were then spent in waiting for the complete cessation of hemorrhage, which was not very considerable. The thyroid cartilage not proving ossified, the sharp point of one arm of a small pair of scissors curved on the narrow edge was inserted with the concavity upwards in the middle of the crico-thyroid membrane, until it disappeared up to the shoulder in the larynx. A single closure of the scissors sufficed to lay the larynx open. The advantages of the use of scissors were deemed to be the avoidance for admission of air until the cut was made, as the instrument filled the wound completely, the celerity of the cut, the greater nicety of cutting in the median line, as the

direction could be completely governed with an instrument so familiar as the scissors. The wound was enlarged by the same instrument up to the hyoid bone. The parts were then held apart by two assistants with two-tined blunt hooks. They answered perfectly, one tine dipping in out of

Fig. 4.

One of the two-tined blunt hooks for holding apart the laryngeal opening, improvised and made by the writer from common dinner table forks.

the way in the larynx above the ventricular band, and the other disappearing below the vocal cord. The bluntness of tips prevented penetration into the parts. The interspace was occupied by the growth. This form of hook was employed by my father the late Dr. B. Cutter, as a powerful, cheap, and useful hook in post-mortem examinations. It is figured in *Heister's Surgery*, London edition, 1757, vol. i. tab. viii. fig. 3. Its use in this operation is, I think, original with the writer. At the instant of opening the larynx the air rushed in with a whizzing noise. Coughing was excited, but ceased after the expulsion of a considerable quantity of blood which was propelled through the opening to the distance of several feet in front. After the coughing the respiration was very tranquil. The larynx was quiet and manageable, very fixed, probably from the hooks and partly from the fact that a warm moisture was maintained in the room by evaporation from a large tin pan on the stove not only during the operation, but also during the convalescence. The polypus was divided and bleeding. It appeared to fill the whole rima glottidis in the form of a cauliflower excrescence subdivided in small globose bodies like a very diminutive bunch of grapes. On the larger lobes were regular lines, some of them dividing up the surface into quarters and some into six or seven pieces, like the division of a cut pie. It was well disclosed, and was exceedingly accessible to the application of instruments besides its fixidity. The growth was readily removed in a few pieces by seizing with forceps and excising with scissors curved on the side and edge. My own special knives were not used. The opening was repeatedly cleansed of blood and mucus, by means of small enclinal masses of sponge held in forceps. Besides this quantities of blood and mucus would be very forcibly expelled, after which all would be quiet. The etherization was maintained at intervals through the opening. No ulceration or other abnormal appearance was detected in the larynx.

After having fully removed the growth, and after my associates had inspected the parts and concurred with my conclusion as to the completeness of the ablation, the seat of the growth was freely touched with solid nitrate of silver. The hooks were withdrawn, the wound held

Fig. 5.

Represents the neoplasm removed by the laryngotomy, in the bottle (natural size).

together, and breathing was found to be easily maintained per orem. The patient was allowed to recover from the etherization, and we waited to see if there should be any hemorrhage or other untoward event. On return of consciousness, vocalization in a whisper was easily effected.

The two parts of the severed thyroid cartilage at the section overrode each other alternately with each phase of the respiration, but it was thought unnecessary to put a suture through them, as it was supposed that the sewing of the skin and compression with adhesive straps would hold them *in situ naturale*. The event proved this to be correct. The wound was closed by five white sewing-silk sutures, supported with adhesive straps, and covered with a dry compress held in place by a bandage. When the patient coughed, air passed out of the opening between the stitches. Put a piece of cork between the teeth to increase the opportunity for the free egress of air. Respiration was easy. The patient was then undressed and put to bed, and the whole operation, from the time of commencing to etherize to the last net, occupied about two hours. 7.30 P. M. Pulse 100; slight headache; deglutition possible but difficult; throat sore on outside, not on inside; patient cheerful; looks well; gave ice, rice broth.

31st, 9.45 A. M. Pulse 92; respiration quiet; skin and tongue moist; countenance and spirits good; expression natural; cough very little; wound swelled and sore outside; not much soreness inside; deglutition comparatively easy; some pain in upper part of chest in front; only on coughing does air pass out the wound; not much oozing of serum; gave tinct. veratrum viride gtt. vj, every two hours as a prophylactic against surgical fever. 11 P. M. Comfortable; pulse 92; skin moist; throat sore; coughs but very little.

April 1. Quiet, pulse 80; breathes easily; no appetite.

2d, 6 A. M. Removed two or three sutures; I left her in the charge of Drs. Spaulding and Shattnek, and returned home, and Dr. S. subsequently sent me the following diary of the progress of the case:—

"April 2, 4 o'clock P. M. Patient very uncomfortable; pulse 72, rather feeble; wound doing well; had taken but little nourishment; did not like beef-tea; ordered chicken broth.

"3d, 10 o'clock A. M. Patient had rather a poor night; sweat on going to sleep; suffered evidently for want of nourishment; had taken nothing during the evening or night; had taken some chicken broth in the morning, and at time of visit was feeling better than any time since operation; wound looking well, removed the remaining suture; occasionally a little air escapes from lower part of wound; pulse 74, good; countenance looking better than since operation.

"4th, 10 o'clock A. M. Patient had a good night, slept more than any night since operation; since last visit has taken more nourishment, chicken broth and a little rye paste, with cream, also drank a little porter; set up half an hour this morning; pulse 80, increased a little probably by sitting up; wound looking well; patient looking better than any day since operation.

"5th, 2 P. M. Patient had a sleepless night, owing, I think, to reading too much the day previous; pulse 80, good; tongue more furred; bowels had not moved for several days; ordered an enema; as the breath continued fetid, gave her chlorate potassa.

"6th, 3 o'clock P. M. Found patient dressed and sitting up; had been up considerably during the day; had passed a better night, slept considerably; felt better after operation of injection the previous evening; wound looking well, upper third healed by first intention; but very little air escapes,

and only, if at all, on making the effort to clear the throat, or conghing; breathing very free and easy; phonation quite as good or better than before operation; appetite poor, although she takes more nourishment and is gaining strength.

"9th. Patient sitting up; pulse 72, good; tongue coated; no appetite, although feeling stronger, but still quite weak; wound healing well; phonation better. Ordered compound tinct. Peruvian bark.

"10th. Patient has been down stairs; feeling stronger; tongue coated; wound healing. Ordered quinia instead of tinct. bark, also fluid magnesia and lemon juice.

"12th. Patient down stairs; tongue cleaning; rests better at nights; says she could not talk so well yesterday; was fatigued day previous with visitors; wound almost healed, all except a little space in the middle where I had touched the granulations with nit. silver; no air through wound for several days; rode out half a mile; phonation not quite as good as on April 9th (fourteen days after operation).

"The weather was very pleasant at the time of my visit, and I invited her to get into my chaise and take a ride. She enjoyed the ride much. She is getting along well, but is weak. She was more prostrated before the operation than any one not well acquainted with her might suppose. She is one that does not complain unless feeling very badly. There has been but very little suppuration; the parts look well.

"7th. Patient doing well; gaining strength; tongue cleaning; wound entirely closed; tongue quite clean; appetite better, although not very good; rode out yesterday, and walked a short distance; phonation better; feels stronger; is still unable to speak, except in a whisper. I think she will talk better as she gains strength. The skin adheres to the trachea, at the lower part of the wound, so that in swallowing it lifts up the skin. The wound has healed very nicely.

"24th. Patient's health is gradually improving. She walks out and rides; made a call on Saturday, and got rather tired. She is not very strong, although she has been taking quinia, pyrophosphate of iron, and porter. She will not be strong enough to visit you for a week or more, I think. Phonation remains about the same, no better than two weeks ago. Breathing seems free. I have not looked into her throat yet. I think her general health was more prostrated previous to the operation than we thought."

May 3. Saw patient at my office. General appearance good; still there is some emaciation and weakness. She sleeps quietly and breathes easily. Says she feels as well as she ever did. Inspection of throat outside revealed a clean, smooth linear cicatrix three inches in length, and in the median line. Upon swallowing there was an evident transverse wrinkling of the skin in front of the neck, due to a small attachment of the skin to the trachea. There was no perceptible projection of one side of the thyroid cartilage over its fellow, and the cartilage felt firm.

Laryngoscopy.—The rima glottidis was small, but not having seen it in health, I could not tell whether it was normal or not in size. Upon the right vocal cord, near the thyroid insertion, was a slight prominence of small size. Colour of cords, reddish. They were symmetrical in movements and divarication.

The aphonia exists, to the disappointment of all concerned. Dr. Spaulding thought that when the patient had rested thoroughly from talking (and he said she had talked a great deal), and had recovered her general

health fully as it was before this difficulty, her voice would return. Once or twice since the operation she has spoken out nearly aloud. Touched the prominence with solid nitrate of silver. Advised cessation from talking, engagement in active and passive exercise, which were adopted.

30th. Dr. Spaulding personally informed me that patient is able to speak aloud.

Under date of June 22d, 1866, Miss Jewell writes: "I am talking with a hoarse loud tone, except when I get tired." This resulted after she was advised to use her voice and to employ elementary sounds, the same as a child does when learning to talk.

July 9. Miss Jewell came into my office speaking out in an audible tone. Her voice is peculiar, having a tinge of a puerile character, but still powerful enough and phonic enough to be very satisfactory. She says it is not "her voice." Thinks it improves with time. Laryngoscopy was as difficult as before from the unruly obstinate tongue. Still the vocal cords were plainly seen to be smooth and almost free from excrecence. The rima-glottidis was rather narrow antero-posteriorly, and it was thought that this narrowness would preclude any but a childish voice.

The longitudinal cicatrix has contracted to two and one half inches in length. The general health is not quite so good as might be desired. There is debility and muscular weakness, indicated by getting tired easily. The patient was encouraged to use her voice reasonably with the idea of further development by physiological exercise.

Nov. 19. Under this date Miss Jewell writes, "I am very well," from which we infer that the cure has remained permanent to this date.

Résumé.—The points of interest in the case may be stated as follows:—

1st. The discovery of an organic cause of the aphonia by the laryngoscope.

2d. The modification of Leiter's forceps and the employment of the improvised blunt two-tined table-fork hooks.

3d. The omission of tracheotomy and tube.

4th. The denuding of the three upper tracheal rings, with their membraneous interspaces preparatory to the possible use of the tube subsequent to the operation.

5th. The apparently complete restoration of voice and health which crowned the operation with success, and which appears providential, inasmuch as it was long delayed after all human means had been exhausted, and as several of similar cases have not been followed with such happy results.

ART. XI.—*Gunshot Wound of the Skull; Recovery.* By BENJAMIN H. CHENEY, M. D., of Joliet, Illinois.

On the 31st day of September, 1865, J. B., a stout and robust farmer's boy, aged 17 years, was out hunting with a double-barrelled shot-gun. He had already discharged one barrel, when, in climbing over a fence, he either caught the hammer in a rail, or, as he himself says, let fall the gun on its breech to the ground with such force that the remaining barrel went off.