CLINICAL OBSERVATIONS

ON THE

INTRODUCTION OF TRACHEAL TUBES BY THE MOUTH INSTEAD OF PERFORMING TRACHEOTOMY OR LARYNGOTOMY.

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[Concluded from page 124 of last number.]

CASE IV.—In this case, the tracheal tube was intended to be used during eradication of an epitheliomatous tumour, this intention being frustrated by the demise of the patient whilst under the influence of chloroform, the tube, however, not being then used. The man was about sixty years of age, but looked older, probably in consequence of excessive alcoholic indulgence, which had been kept up for many years. He had chronic bronchitis with muco-purulent expectoration, in consideration of which considerable doubt was expressed to him about operating; but, as he was very anxious to have the rapidly extending disease eradicated, it was determined to do so.

Owing to the state of his lungs, it was deemed necessary to make a preliminary trial of the tube, in order to observe its behaviour under the profuse expectoration. The tracheal tube was passed, and, during its retention, considerable quantities of muco-purulent secretion were expelled—on several occasions quite clear of the tube, and even in some instances for a considerable distance beyond it—two, three, and even four feet beyond the nozzle of the tube. In order to lessen the secretion, a few days were allowed to elapse, during which remedial measures were resorted to. At the end of this time, the muco-purulent secretion had lessened, and the tube was again tried. On this occasion, the tracheal catheter was inserted, and all the purposes for which it had been introduced having been gained, it was removed at the end of ten minutes. The expectoration was much less; the tube, which the patient held with his own hand, was borne without pain or uneasiness. During the time it was retained, his respirations were easy; he pronounced the monosyllables “Yes” and “No” distinctly; he swallowed his saliva, and drank several mouthfuls of water without disturbing his tranquillity. The way now seemed clear, and it was resolved to operate.

Next morning, in the ward adjoining the theatre, the tube was introduced into the trachea, the patient as usual holding the outer end; he remained there for a quarter of an hour, breathing easily. He then walked into the theatre and lay down on the table. Chloroform was just commenced to be given him, when he rose up, withdrew the tube, handed it to the surgeon, said he would prefer to take the chloroform without it, and that it could be introduced afterwards. He then lay down to inhale the anæsthetic. A few minutes afterwards, he was asked to turn on his side, with which request he readily complied. He breathed quietly and regularly for ten minutes afterwards. He then had what was considered at the time to be the ordinary period of struggle. This ended, the house-surgeon, who was administering the chloroform, stated that for several minutes after the struggle passed off he both felt and heard the respirations going on quite regularly, and certainly his chest was heaving as if from normal respirations.

Nearly five minutes after the struggle had ceased, one of the gentlemen, who held the radial pulse the whole time, cried out that the pulse had stopped. The house-surgeon said: “That surely cannot be, as he is breathing all right.” A few seconds later, the breathing ceased. The moment the breathing ceased, the tongue was instinctively withdrawn, and artificial respiration established. Bloodletting was spoken of at the moment, as it was considered that there was an apoplectic element in the case, interpreting the former struggle as a convulsion; but, the heart not responding, it was not carried out. It must be clearly remembered that the patient spontaneously withdrew the tube and handed it to the surgeon, just as he was about to be anæsthetised, and before he was under the influence of the chloroform. Fully fifteen minutes elapsed from that time till the cessation of the cardiac action. The respirations were never for a moment impeded, and actually continued for a few seconds after the cessation of the cardiac impulse.

Viewing the case as it then stood, I was inclined to believe—though a positive opinion could not be formed—that there was a primary cerebral lesion, probably apoplectic, and that the cardiac cessation was secondary.

The necropsy showed an effusion of serum under the arachnoid; and the lateral ventricles were abnormally distended and filled to distension with serum, showing the chronic nature of the affection. There was no

impediment to respiration in the larynx, trachea, or bronchial tubes. The lungs were oedematous, and exhibited the appearances of chronic bronchitis and inflammation of old standing. The bronchi and bifurcation of the trachea were congested, the congestion extending for about an inch above the bifurcation. From this point, there were several inches of slight congestion, the shade becoming very slight as it proceeded upwards toward the true cords. At these isolated points, two of them above and one below the vocal cords, there were appearances of ecchymosis on the mucous membrane, each having a superficial area of about three millimètres in diameter (about the size of a small pea or a large barley-grain). In cutting into these, it was seen that they were superficial, extending no further than the mucous membrane. The cords were very slightly thicker than normal, probably due to some chronic action. There was also a slight thickening of the posterior part of the laryngeal orifice.

The appearances noted from about an inch above the tracheal bifurcation were such as would have passed without observation in any ordinary case; but, as the opportunity offered, it was considered advisable to take a minute note of them, and they are thus given in detail.

Death was due to the chronic cerebral affection, the anæsthetic perhaps acting as an exciting cause.

Hack's Case of Edema Glottidis.—After having had the experience of these cases, commencing in the summer of 1878, and having shown one of these patients at the Glasgow Pathological and Clinical Society, on November 12th, 1878, it was with considerable pleasure that I read, in that valuable paper the *London Medical Record*, a reference to a case of an acute laryngeal affection, in the treatment of which one of Schrötter's bougies was introduced into the larynx through the mouth. In turning to the original, which appeared in Volkmann's *Sammlung Klinischer Vorträge* for November 1878, it is seen that Dr. Wilhelm Hack had a patient who was seized with acute oedema glottidis, superinduced on a chronic syphilitic affection of the mouth and larynx; and, when he was at the point of suffocation, Dr. Hack introduced No. 3 of Schrötter's triangular vulcanite instruments, which he retained for a short time. This man was then sent to the hospital; but, on the road thither, he became violently affected with dyspnoea, when he (the patient) took the vulcanite tube, which he carried in his pocket, and introduced it into his own larynx, and so appeared at the hospital with his hands clutching the tube, “as if clinging to his last anchor of safety”. Dr. Hack continued the treatment in the Freiburg Hospital. The same evening, he introduced No. 5 of Schrötter's bougies, and, during the two following days, gradually introduced larger ones up to No. 11. He does not mention the precise time these instruments were each retained; but, in the discursive part of his essay, he says, referring to his case, the instruments were retained for almost an hour, and the patient neither complained of particular pain nor disagreeable sensation. From this, it would appear that Dr. Hack retained the instrument in the larynx for a short time only (almost an hour), and that he aims at rapid dilatation of the larynx by the introduction of Schrötter's graduated bougies. His patient ultimately made a good recovery.

History.—It may be advantageous to review briefly the few items of history obtainable concerning the introduction of respiratory instruments by the natural passages. Without stopping at Hippocrates, who is accredited with having entertained ideas on the subject which never found practical issue, we pass to Desault. (*Œuvres Chirurgicales. Exposé de la Doctrine et de la Pratique de Desault*; par Bichat; tome ii. Paris.) Toward the end of Desault's life, he endeavoured to introduce instruments through the nose into the trachea. He was induced to do so by having one day by mistake passed a tube into the trachea instead of into the œsophagus. Two hours afterwards, when he attempted to inject food into the tube, he found out his error. Reasoning from the tolerance exhibited by the trachea in this instance, he thought that the same procedure might be purposely adopted in laryngeal affections. He therefore determined to carry it out. The first observation is mentioned by Geraud, in which Desault passes a tube into the larynx of a man having a laryngeal affection, which afforded him relief, the breathing going on freely through it; though the man died the same evening from causes independent of respiration. The second observation was made on a man affected with something resembling oedema glottidis, on whom Desault passed a tube through the nose into the trachea, which was retained for a day and a half. During this time it was once withdrawn in order to be cleaned. Its reintroduction was attended with little cough; and the man at the end of a day and a half was cured. These observations are given in a very meagre way, almost as isolated statements, and the series of phenomena which attended the introduction and retention of such instruments into the air-passages are barely touched on. In some measure, this may be accounted for by the work not having been written by Desault, the facts not even being gathered from his lips, so that not

only do they lose the life and vivacity which personal description would have imparted, but much also that would have been of value to the surgeon. If these remarks apply to the facts, they are doubly applicable to the instruction which follows, for the introduction of nasal tubes into the trachea. Anyone who doubts this, has but to try to carry out the instructions given by Bichat for the introduction of nasal tubes, in order to convince himself of the correctness of my opinions. Equally erroneous and misleading are the signs given by which evidence may be afforded of the presence of the sound in the trachea.*

These observations were made at the beginning of the present century, and from that time up till 1858 there is no mention of the subject.

M. Bouchut, in 1858, brought before the Academy of Medicine (*Comptes Rendus de l'Académie des Sciences*, tome xlvii, September 1858), what he termed *le tubage du larynx*. This consisted in placing in the larynx a tube eighteen to twenty-four millimètres long, and from six to fifteen millimètres wide. This little tube was inserted into the larynx on the point of a hollow sound. The sound was withdrawn after depositing the tube on the vocal ends, resting on them by means of a couple of pads. A silken bridle was likewise fastened to this little tube, in order to withdraw it when necessary.

Whatever merit this apparently ingenious little instrument may have possessed, it was brought before the Academy under very unpropitious circumstances. First, that element of success necessary for the favourable reception of a new idea was deplorably absent in his cases; as all of them were failures, five of them having died out of seven; the remaining two only recovered after recourse had been made to tracheotomy. Again, Bouchut was so unfortunate as to fall foul of tracheotomy, which at that time not only had found favour, but was warmly espoused, by the then medical Parisian demigod, Trousseau (*Archives Générales de l'Académie de Médecine*, vol. xii, 5th ser., p. 739; vol. xiii, 5th ser.), who condemned *le tubage*, at least for cases of diphtheria. A long, animated, and somewhat personal discussion followed in the Academy. Malgaigne, Velpeau, and Larrey (*Op. cit.*, Jan. 18th, 1859; also *Bulletin de l'Académie Impériale de Médecine*, tome xxii, 1857-8, tome xxiii, 1858-9), among others favoured Bouchut, and encouraged him to proceed with his observations, the latter remarking, that the Academy ought to bear in mind, that several operations, which were at that time accepted, had been opposed at the outset by that august assemblage; instancing disarticulation of the hip, and tracheotomy itself, in support of his observations. Probably discouraged, Bouchut does not appear to have again attempted the proceeding.

Passing over the abortive attempts of Jules Roux (*Gazette des Hôpitaux*, 1856) and Depès (*Gazette des Hôpitaux*, 1869) to introduce tubes by the mouth in chronic cases after tracheotomy had been performed, the proposal of Trendelenburg to introduce solid metal bougies into the larynx in chronic cases is arrived at. Though Trendelenburg (Langenbeck's *Archiv*, Bd. xiii, p. 338) realised his proposal in one case, it was left to Schrötter to perfect the idea and to practically carry it out. It must be here clearly understood that both Trendelenburg and Schrötter (Schrötter, *Beitrag zur Behandlung der Larynxstenosen*, Wien, 1876) proposed and practised dilatation of the larynx only in chronic cases. Weinlechner (1870) proposed the use of rounded tubes in chronic cases, instead of Schrötter's triangular or three-cornered ones. There is, however, no case recorded in which Weinlechner carried out his idea on this point. This brings us down to the present time. Dr. Hack of Freiburg published his case in Volkmann's *Sammlung Klinischer Vorträge* for November 6th, 1878, in which he adopted Schrötter's tubes and principles in an acute case of laryngeal stenosis. The date of this case is not given; but from the context it is clear that it must have been not later than the summer of 1878. In the present paper, I detail three cases, the first of which occurred in the summer of 1878, and the other two in the latter part of the same year, all of them being successful. Hack adopts Schrötter's instruments and principles (being a pupil of Schrötter's). I introduced cylindrical tubes by the mouth, retaining them *in situ* for twelve hours at a stretch, and removing them for purposes of ablation. The object in doing so was twofold: first, to enable respiration to be carried on; and, secondly, to cause absorption of the fluid by the presence of the tube exercising pressure of a slight kind.†

Historical Résumé.—There are, first, nasal tubes, proposed at the beginning of the present century by Desault, who in two cases passed them into the trachea. One of his patients died; the other recovered.

Second. *Le tubage du larynx* was proposed in 1858 by Bouchut, and practised by him in seven cases, all of them being failures.

* Mention is made in Desault's works of a Toulouse surgeon who attempted to relieve a lad affected with polypoid growths round the larynx. Six times he tried to introduce the catheter, but each time the instrument appeared only to produce irritation, and eventually he desisted.

† A clear distinction must be drawn between respiratory catheters and instruments used for aspirations or insufflation, such as Chaussier's tube.

Third. Trendelenburg and Schrötter within the last few years have passed three-cornered vulcanite tubes into the trachea in chronic cases, and retained these cases *in situ* for a portion of an hour at a time; Dr. W. Hack having carried out the same principles with the same instruments in one acute case during or before the summer of 1878.

Fourth. The writer introduced cylindrical tubes by the mouth into the trachea, and retained them *in situ* for thirty-six hours, removing them when required for ablation (say every twelve hours); two such cases having been treated with perfect success.

Is the Introduction of such Tubes easy?—The following is a question very often asked: Is the introduction of tubes into the trachea easy? This at all times must be a difficult question to answer for others, as the case will depend on the experience of the operator. Personally, having had considerable practice in the passage of oesophageal bougies and catheters, I would be inclined to say that the introduction of tracheal tubes would be more difficult than the passage of urethral catheters into normal urethrae; but they could be passed a great deal more easily than catheters in most cases of urethral stricture. Before passing tracheal instruments in the living, it would be well to practise on the "subject", as this helps to cultivate the touch. Given a quiet patient in health, the introduction of the tracheal tube will be found almost as easy for the operator as its passage *post mortem*. In the two cases of oedema glottidis which I have treated in this way, the introduction of the tubes was more easy than in the cases with healthy larynges. In the former, the parts were fixed, thrown further forward in the mouth, and much less sensitive, all favouring the introduction of the tubes. The first insertion is for the patient the most disagreeable, the subsequent ones being attended with comparatively few manifestations of uneasiness.

Mode of Introducing the Tubes.—The mode of introducing the tubes has already been alluded to in the remarks on the dead body. The only difference is that, if any hitch occurred at the level of the cords, it might be overcome by asking the patient to take in a deep inspiration, during which the instrument ought to be passed. The head ought to be thrown back during the insertion of the tubes.

Advantages over Tracheotomy.—Besides the superiority which the simple introduction of a tube into the trachea through the mouth has over a cutting operation, which in itself is not unattended with danger, the following points may be noted as advantages on the side of the former. The air, as it passes through the natural passages into the lungs, becomes warmed, moistened, and filtered. When a wound is made into the trachea through the neck and a short tube is inserted, the cold dry unfiltered air gets access to the lungs, and often produces fatal congestions. Every surgeon knows how difficult it is, even in hospital, to maintain for days continuously an uninterrupted supply of extraneous warmth and moisture; and how, now and again, in spite of the very best arrangements, a hitch occurs, during which cold dry air gains access. The tubes introduced through the mouth do away with the necessity of supplying extraneous warmth and moisture. A tubular instrument, passed through the mouth into the trachea, will convey heated moist air into the lungs, and to a considerable extent will filter it of its dust and organic particles. Even a tube, with one end in the trachea and the other projecting from the mouth, will attain, a few minutes after insertion, the same heat as the human body; and as a consequence will temper the air as it passes into the lungs. After a short time its interior will be covered with moisture, which will offer an extended surface for adhesion of organic particles, and so help to filter and at the same time moisten the air.

Cases in which these Tubes might be Used.—It will be observed that I do not particularise the kind of cases in which tracheal tubes passed through the mouth may be used, further than by stating, that there are obvious reasons for preferring tracheotomy or laryngotomy when foreign bodies are in the windpipe; and, on the other hand, for preferring tubes through the mouth where there are effusions of blood or serum, or collections of pus, into or about the submucous laryngeal tissue; or when anything overhangs or threatens to occlude the laryngeal orifice. Again, it may be asked, whether such instruments might not be of very considerable service in cutting short many spasmodic affections of the cords and upper portions of the larynx—such as spasmodic croup, laryngismus stridulus, and in some cases of incarceration of the epiglottis, etc. Tubes inserted in some such cases might not only relieve the spasm, but also help to cure the disease by destroying the habit.*

Cases in which the disease, or at least the necessity for using the tubes, would be of short duration, are the most suitable for this procedure. Again: where the person is too weak or objects to have tracheotomy performed, or where the practitioner does not care about perform-

* Baginsky agrees with Bretonneau, Gerhard, etc., that the dyspnoea in croup is the result of mechanical obstruction only, and does not believe in the absolute paralysis of the abductors of the vocal cords.

ing it, the tubes passed through the mouth might be used, even in the latter case, to gain time to allow an operative surgeon to be called.

The tubes must necessarily be of various sizes, so as to suit the various larynges into which they may be introduced. At present, a tube of a better shape and form than that now in use, and one which will present other advantages, is being prepared for me.

It must be obvious that the time during which the tubes are retained must depend on the case. In some, a few hours might be sufficient to dispel the oedema; in others, a much longer period is necessary.

How to recognise that the Instrument is in the Trachea.—How would one recognise the presence of the instrument in the trachea? 1. By finding the instrument pass over the first ring or two of the trachea; 2. By finding that the air flows into the tube during inspiration and out during expiration—the opposite being the case if it be in the oesophagus; 3. By the mucous expectoration being expelled from it; 4. By the negative signs that it is not in the oesophagus or stomach—i.e., blowing up the stomach through the tube, etc. Before introducing the tubes, an examination by the laryngoscope ought to be made to ascertain the precise state of the parts.

Deductions.—The practical deductions which may be drawn, tentatively at least, from these cases are as follows.

1. Tubes may be passed through the mouth into the trachea not only in chronic, but also in acute affections—such as oedema glottidis.
2. They can be introduced without placing the patient under an anæsthetic.
3. The respirations can be perfectly carried on through them.
4. The expectoration can be expelled through them.
5. Deglutition can be carried on during the time the tube is in the trachea.
6. Though the patient at first suffers from a painful sensation, yet this passes off, and the parts soon become tolerant of the presence of the tube.
7. The patient can sleep with the tube *in situ*.
8. The tubes, in these cases at least, were harmless.
9. The ultimate results were rapid, complete, and satisfactory.
10. Such tubes may be introduced in operations on the face and mouth, in order to prevent blood from gaining access to the trachea, and for the purpose of administering the anæsthetic; and they answer this purpose admirably.

NOTE ON HOMICIDAL MANIA.

By JAMES RUSSELL, M.D., Senior Physician to the Birmingham General Hospital.

THE following particulars given me by the mother of an out-patient at the Birmingham General Hospital, and by the patient himself, explain themselves. In a forcible manner, they tell the tale of what passes in the mind of many an epileptic when driven by his disease to sudden acts of violence; and explain the homicidal tendency which sometimes springs up under such circumstances.

A young man, aged twenty-nine, has been under me, at times, for several years, a confirmed epileptic, and the son of a father equally confirmed in the same disease. His fits were kept under by moderate doses of bromide of potassium, but, after the 31st of last January, his medicine was suspended in consequence of the want of an out-patient ticket. The fits then returned with frequency; about two severe ones, with tongue-biting, occurring in a week, but very numerous slighter ones. In March, the first attack of the mental disorder, to which this communication refers, took place: it lasted for a fortnight, and yielded to medical treatment. The patient was violent for three days, and then fell into a condition of melancholy, "as though a cloud were on his brain". In a week after his recovery of mental health, the fits returned—they had been absent during the period of mental disorder (of course, I speak only from the mother's report)—but again, at the end of eight weeks, the mental affection returned, and again yielded to treatment at the termination of about a week. As before, the recovery of sanity was followed by recurrence of the epileptic fits, mostly in a slight form; and for the third time the mental disorder attacked him (May 19th), and yielded to remedies in ten days.

The mother gave the following description of the mental disorder. He had a constant fear of being dared to hang himself; he told her that, if she did not take every care of him, he would be obliged to do it; he did not like to be considered a coward by people standing before him (in imagination); they kept showing him how to do it; and he thought that if his mother took him to a doctor, he would drive the figures away. This "thought over him" lasted all the time. He wandered about, sensible in other respects, but with a sort of pitiful expression, more child-like, and with a tendency to cry. "It is ridiculous," he said, "to talk of anything else, for I have got it in my mind, but it never

comes when I am right." He dared not sleep; for, if he closed his eyes, "he saw so many".

The patient himself told me that it was like a man before him; there was like a scaffold and a rope, and they kept showing him the way to do it. They said, "You dare not do it! you dare not do it!" Something felt very heavy on his forehead, and all was dark about him. "I could not bear the thought of hanging myself; but nothing else would come into my mind." When these "feelings" were passing off, something passed from the forehead, over the face, then down the arms, out at the fingers, and then he became himself again, and could think of other things.

This young man has been more or less epileptic from infancy, but he has only suffered once before from any mental derangement. He then had an idea that his mother loved his brother best, and that seemed to work on his mind. He thought he must get rid of his brother. One day his mother heard him threaten his brother, and open his knife; he was easily induced to part with the knife, observing that he thought he had better do it to himself instead.

The patient's attestation to the compulsory nature of this suggestion, and to the impracticability of his varying it by any effort of his will, and at the same time his half-consciousness of the unreality of the whole, are worthy of notice. What if this countercheck be weakened or removed?

COLOUR-BLINDNESS AMONGST THE MEDICAL PROFESSION.

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IN the JOURNAL for October 25th, 1879, Mr. Herbert W. Page published an article on "Colour-blindness: its Examination and Prevalence". I have commented at some length on this subject in a previous communication, and would now merely report in reference to a suggestion he then made. He proposed that the members of the British Medical Association should be most carefully tested at the Cambridge meeting in August next, to ascertain the proportion who are colour-blind "among those who neither lack education, observation, or cultivation".

To partly answer this suggestion, I have recently tested 465 of the members of the American Medical Association at the New York meeting, and of the members of the Massachusetts Medical Society, at the annual meeting here in Boston. I found, among these 465 physicians, 22 colour-blind. Of them, 14 were red blind, 2 green blind, and 6 incompletely colour-blind, using the standard of Professor Holmgren. The whole number of males I have so far tested is 17,327. Of these, 724 were colour-blind in a degree to be included in the classes proposed by Holmgren. I have also tested 13,813 females, finding only 10 colour-blind.

Unless the whole of a large number of people are tested, the ratio, we find, may be quite above or below 4 per cent., which seems to be the true average for males. For instance, in New York I found but 6 out of 195; here in Boston, 16 out of 270. As a general thing, perhaps, as many colour-blind, from various reasons, stay away as apply to be tested. Here in Boston none of my professional brethren whom I knew to be colour-blind came to me. Could I have tested the other 2,000 of the medical profession attending these two meetings, I am quite convinced that the whole would have given me the usual 4 per cent. average. If the members of the British Medical Association are tested at Cambridge, the proportion found colour-blind will depend on the number examined, and whether those thus defective apply or stay away. If 1,500 be present, they can all be tested in three days by one person working six hours each day, provided it could be so arranged as to have a steady stream before the examiner.

Now what method of testing could accomplish this with certainty and accuracy? A pretty extended experience, theoretically and practically, convinces me that such investigations can be carried out only by Holmgren's method, with which none other compares. Certainly with it, as with all methods, it depends largely on the examiner, who must be all eyes in watching the face, fingers, and look of the examined. The latter had far better not speak, or at least confine this to a question of what is asked of him to do. The examiner can explain what is needed, and one after another sees what is done by those before him. It is also a test of mental and physical quickness.

In a previous communication to the JOURNAL I have defended the accuracy of my published results. In these tests of my medical brethren, I of course had the advantage of their being desirous to appear the best, and also do as nearly as they could just what was asked of them. The bystanders constantly wondered that I did not mark as defective many who seemed so to them. This test of my friend, Professor Holmgren, when the right worsteds are used (a most important point), and the