tance of the focus tube from the same, the more is the shadow enlarged; and the nearer the bone to the plate the sharper the outline of the shadow. The aim of the skiagrapher, therefore, is to get the bone as near to, and the tube as far from, the plate as may be. In practice, however, so much power is lost by removing the tube to a distance that in skiagraphing dense and thick parts it is generally kept near, and sharpness has to be sacrificed, to some extent, to penetration.

In no part of the body are mistakes more likely to be made than in considering skiagraphs of the pelvis and hips. At the Congress of the German Society of Surgery at Berlin in April, 1898, Hofmeister showed a number of skiagraphs of one normal pelvis from various points of view which gave various false appearances of deformity of the pelvis and femurs. It is, however, not necessary to go to the trouble of producing x-rays and to the expense of large plates in order to show the form of the images which would be produced in various relative positions of focus tube, skeleton, and plate. Exactly similar images may be produced by means of a small lamp, the bones in question, and a sheet of paper. In this way the shadows from which the annexed illustration was photographed (with the exception of A) were produced. They were all taken from the same normal left femur of an adult; A is from an outline of the upper end of the bone which was laid with the posterior surface of its head and its lesser trochanter resting on the paper. To insure accuracy, the pencil was held in the pencil-holder which was described in the *Lancet* of April 29th, 1893.

Fig. 1.—Shadows of upper end of femur, left; A, Outline (actual size) filled in; B, Not rotated; C, Rotated out about 40 degrees; D, Rotated in about 30 degrees; E, Light over a point of body 9 inches above hip joint and 10 inches from surface (equivalent to hyperextensions); F, Flexed about 45 degrees.

In B, C, D, and F the relative positions of light, femur, and paper were such as would probably occur in skiagraphing an adult pelvis when, as is usually the case, shadows of both hips are desired for purposes of comparison. In such a case the tube is usually placed over the middle line, between the hip-joints, and at a variable distance from the plate, which may fairly be estimated as 12 inches, the plate lying under the supine body of the patient. The most posterior part of the head of the femur would in a well-developed adult be about 3 inches or more from the plate. The shaft of the femur from which these shadows were formed was therefore held vertically in a tube-holder, the nearest part of the head of the bone being 3 inches from the paper. The light was placed 3 inches horizontally inwards from the innermost part of the head of the femur—this may be assumed to be about the average distance of the bottom of the acetabulum from the middle line—and 12 inches from the surface of the paper. The paper itself was in all cases fixed flat against a wall. The resulting shadows were outlined with a pencil and afterwards blacked in before they were photographed. The

shadows resemble the images that would be seen on looking at the plate with the film surface towards one.

In B the bone was neither rotated in nor out. A comparison with A shows it to be enlarged, as all the shadows are, and slightly distorted owing to the obliquity of direction of the rays casting the shadow. In C the femur was rotated outwards about 40 degrees. The neck appears much shortened, and the angle between it and the shaft much increased. A similar appearance is very often seen in skiagraphs. In D the femur was rotated inwards about 30 degrees. In E it was not rotated, but inclined as if flexed 45 degrees. In F the bone and paper were in the same relative positions as in B, but the light was moved upwards and outwards, so that it was 9 inches above the head of the femur, and 10 inches horizontally from the plane of the paper. This corresponds to a position about over the eighth costal cartilage in the nipple line.

In the paper above mentioned, Hofmeister stated that the angle of the neck with the shaft of the normal femur might be made to appear as small as 90 degrees by alterations of the relative positions of light, plate, and skeleton. The shadow shown at E, however, is the nearest approach to such an appearance that could, I think, be unintentionally produced by even the most careless or inexperienced skiagrapher. It is easy to test the truth of the above statements in five minutes with the help of a night light (or other small bright source of light) a femur, and a sheet of white paper pinned against the wall.

A point of interest in skiagraphs of the pelvis in children is the evidence of the presence of the Y-shaped cartilage in the acetabulum, which shows in a print as a clear space. This marks the position of the cotyloid cavity, and it will be seen that the head of the femur when normally in joint lies almost entirely below this cartilage.

Hofmeister has pointed out that in skiagraphing both hips with a view to obtain information as to the angle between neck and shaft, if the patient be supine with the plate underneath him, the thighs should be rotated inwards in order to obtain a result that will not mislead. Even thus the shadow will be somewhat distorted (see D in figure), for although the plane of the head and neck may be at right angles to the path of the rays, the dry plate will be oblique. Moreover, in coxa vara rotation inwards is often impossible, and the limb strongly rotated outwards. In such a case it would seem to be better to skiagraph each hip separately, with the patient prone or supine as seems most convenient, placing the tube so that the rays shall pass perpendicularly to the posterior or anterior surface of the neck, and placing the plate as nearly as possible parallel to that surface.

REMARKS ON LARYNGEAL GROWTHS IN YOUNG CHILDREN.

*Being the concluding portion of a Post-Graduate Address at the
Eye, Ear, and Throat Infirmary, Edinburgh.*

By G. HUNTER MACKENZIE, M.D.

THE subject of laryngeal growths in young children is one to which I wish next to direct your attention, because in the first place the complaint is not uncommon, and secondly on account of the line of treatment which I intend to recommend to you being alike different and simpler from that usually followed. I am fortunately able to present to you a case upon which, in the first place at least, my remarks will be based.

The patient, a girl aged 17 months, has suffered from increasing huskiness for about one year. From the date of birth until she was from 4 to 5 months old, she is represented as having a perfectly clear voice; of this her parents have no doubt. At this age, and apparently without any exciting cause, it was noticed that when she cried her voice was slightly husky; this huskiness has never disappeared, but on the contrary has slowly and gradually become more marked, and now you distinctly recognise that a considerable degree of it is present. You will also notice that some respiratory stridor can be detected, not so much when the child is quiet and at rest as when she cries and struggles. No history of any hereditary tendency to disease can be elicited, and the child has not at any time suffered from serious illness.

Such, in short, is the history of the case. What are the conditions giving rise to these symptoms, and how can they be diagnosed? In a child of such tender age as the one now before you I do not think it necessary to make use of direct or indirect laryngoscopy, which in either case would require

to be "forced." The development of the symptoms as already detailed plainly points to the larynx and to the presence of growths on the vocal cords as the seat and cause of trouble. In elder children the laryngoscope may be used, or the supraglottic area of the larynx may be palpated with the finger tip, and by one or other or both of these means the growths may be seen or felt. But, apart from these methods, the diagnosis can be arrived at by a process of exclusion, for there is nothing which can produce the above train of symptoms in a young child but the presence of warty growths on the vocal cords. True, a somewhat persistent variety of huskiness may be induced by a form of dry laryngitis (laryngitis sicca), but its degree varies from time to time according as the secretion is got rid of, and the oro-pharynx and naso-pharynx usually participate in the trouble. Then the huskiness dependent upon attacks of ordinary inflammation is of a transient nature, and has not the persistent and slowly-progressive character of that associated with and dependent upon the presence of growths. In the later stages the gradual supervention of laryngeal stridor and dyspnoea is very characteristic.

We have, then, to deal with a case of growths on the vocal cords, at first affecting vocalisation only, but ultimately producing respiratory symptoms also. So far as I have been able to make out, this condition may arise at three different periods of child life. In the first place, it may be there at birth; in the second place, it may be detected for the first time at any period up to about the sixth month of life with no appreciable exciting cause; and in the third place it may occur as a sequela of one of the exanthemata at any age up to about the fifth or sixth year. As to the frequency of these periods of commencement, I am of opinion that congenital cases are less common than the others, which appear to be about equal in their frequency of occurrence.

It is to the treatment of these cases of growths in children that I wish more particularly to direct your attention. I may mention that similar growths occasionally develop in or invade the trachea, and some authorities assert that they then appear to have a syphilitic character. Such, however, is not the case with the laryngeal variety, for it does not respond in the slightest degree to antisiphilitic remedies. Nor, as others maintain, does the internal administration of arsenic affect it. Of the local application of alcohol I have had no experience, but it is right that you should know that it has of late been highly recommended by very competent authorities.

It is to surgery that we must turn for successful treatment. When respiratory difficulty and embarrassment ensue, as they do in every case sooner or later, relief must be given by intubation or tracheotomy. The former operation is inadmissible for reasons which will be presently stated. Tracheotomy, therefore, must be performed for purely palliative purposes in the first instance. Should another operation be subsequently performed for the removal of the growths, and, if so, what is its nature?

There are two methods by which the direct removal of the growths may be attempted, without or after tracheotomy—removal *per vias naturales*, or by thyrotomy. Now you may take it as an axiom that both these operations, though still practised by some surgeons, are inadmissible in young children, for the simple reason that direct interference with, or mechanical irritation of the growths is almost always followed by rapid recurrence. For example, it is not uncommon to find in the medical journals records of cases in which thyrotomy has had to be repeated every few months, and one case has been published in which the surgeon performed this operation seventeen times within a period of three years for rapid recurrences. That is, if I may so phrase it, the "grossest" case that I have come across, but several examples, to which I can refer you, have been recorded, in which the performance of thyrotomy has been necessitated three or four times within the year on account of recurrences, the result being a more or less permanent affection of the voice and a stenosis of the larynx. Then the mortality in young children after thyrotomy has been found to be exceptionally high. As regards endolaryngeal treatment, in the first place I am very sceptical of its being able to be carried out in such very young children as in the patient brought before you to-day; in the next place it usually involves a prolonged series of operations;

and, lastly, it is very frequently followed by recurrences. Intubation appears to have a somewhat similar irritative effect upon the growths, and, moreover, the tube is difficult of retention, and its use is consequently unsuited for a class of cases in which it may require to be kept *in situ* for a prolonged period.

The important point, and one which I wish to impress very deeply upon you, is that tracheotomy in this disease is not only a palliative but also a curative operation.

What is the order of events after its performance?

First of all, the breathing is relieved, and as time wears on we find in the next place that the growths, now freed from the irritation of coughing and phonation, gradually lose their vitality, and become detached from the vocal cords, without any tendency to recur. If we take care to have the expectoration and secretion from the windpipe, more especially when the tube is removed for cleansing purposes, preserved and examined, we shall readily detect the presence of the growth or growths, and I now show you a number of them obtained in this way. These were collected during a period of about six months by the mother of one of my patients, aged 3 years. Doubtless several growths, or pieces of growths, escaped detection.

Fig. 1.—Papillomatous growths spontaneously detached from vocal cords after tracheotomy. Photograph, natural size.

The largest piece in the collection having been used for microscopical examination is not represented; it proved to be a papilloma, as these cases usually are.

You will no doubt expect me to give you some idea as to how long the growths take to separate, and when the tracheotomy tube may be removed. I used to allow at least one year, but latterly I have found six months sufficient, and I think that, in the great majority of cases, the latter period of time will be found quite long enough. A case has been recorded in which the growth had separated, and the voice became normal in one month; others, again, have required from three to four years. An important point to which attention has not previously been directed is that the success of this method of treatment is more marked, and the time during which the tube requires to remain in the trachea is shorter, in the case of "virgin" growths than with those which have been irritated by previous intralaryngeal treatment or by thyrotomy.

Meanwhile, whoever is in charge of the patient should keep a sharp look-out on the expectoration and laryngo-tracheal secretion, and preserve any growths which may come away, for upon the size and number of those depends, to a certain extent at least, the length of time during which the tube should be worn. If the growths separate freely before six months have expired, I should be inclined to remove the tube correspondingly early. Its removal, I may add, is always objected to by the child, who finds it difficult to return at once to the normal method of breathing, and one or two short reinstructions may be necessary, but these should not lightly be had recourse to. After the permanent removal of the tube, there may be some slight occasional recurrence of the laryngeal stridor and dyspnoea, especially when the child is annoyed and made to cry, but there is no recurrence of the growths. Subsequently the voice gradually recovers without further treatment, and I have seen vocalisation return to such

degree of purity as to lead anyone who did not know the history of the case to conclude that nothing had at any time been amiss with it. Some huskiness—gradually decreasing, however—may remain for a year or longer.

In the case which I have to-day brought under your notice, I propose to perform tracheotomy, but not until the respiration is more markedly affected than it is at present. I shall then allow the tube to remain in the windpipe until the growths have separated, which I feel almost certain will take place within the year.

NOTES ON A CASE OF ABSCESS OF THE LUNG SUCCESSFULLY TREATED BY DRAINAGE.*

By J. W. CRERAR, M.B.,
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THE diagnosis and treatment of abscess of the lung are perhaps not so simple as to make the record of another case either commonplace or superfluous.

A boy, J. P., 9 years of age, was seen on March 2nd, 1898. He was suffering from pneumonia of the right lung. The percussion dullness of the right base became more marked in a day or two, but no fluid was present, as was proved by puncture. In the course of 8 or 10 days he was apparently quite convalescent. He was not seen again until April 1st, when it was at once evident that he was profoundly ill. His mother stated that "he had been failing" for the previous fortnight. He was extremely emaciated; his skin was dry and harsh to the touch, and of a dull yellow grey colour; his pupils were widely dilated, and his expression anxious. The photograph (Fig. 1) taken at this time well illustrates his appearance. He had a harassing cough, but no expectoration. His temperature on this day was 99° F., and his pulse 134.

Fig. 2.—J. P., July 22nd, 1898, 4½ months after operation; note scar and good thoracic contour.

On April 3rd his temperature was 103° F., his pulse 144, and his respirations 36 in the minute. The right side of the thorax did not move freely, and over the nipple measured 27 cm., as compared with 25 cm. on the left. Anteriorly, there was no abnormal percussion dullness except towards the axillary line, where a dull area joined the liver dullness. The left margin of the heart extended just beyond the nipple line. The liver was not depressed. The respiratory murmur on the right side was puerile, with an occasional rhonchus. There was no cardiac murmur. Posteriorly, percussion gave an impaired note over the whole right side, which became absolutely dull from the level of the fifth dorsal spine to the base. Vocal fremitus was present all over the right side. Auscultation revealed well-marked bronchovesicular breathing above the level of the

fifth spine, with bronchophonic vocal resonance. Below that level the breath sounds were more distant, and were almost lost from the level of the eighth spine. The vocal resonance was ægophonic over the greater part of the base. A sharp, squirting, systolic murmur was present over an area, about an inch in diameter, just internal to the vertebral border of the scapula, opposite the fifth spine, the significance of which was not apparent. Examination revealed no abnormality on the left side.

The diagnosis of empyema was made. Early operation was deemed imperative, and on the next day, April 4th, I performed the following operation, assisted by Dr. Bannerman. A large needle of a serum syringe was introduced upwards and backwards through the seventh intercostal space in the posterior axillary line, and pus was at once found. A portion of the eighth rib, 4 cm. in length, was resected. The pleura was thin, and did not bulge; it was punctured with dissecting forceps but no pus appeared; the opening was dilated, and a finger introduced to explore. The pleural cavity was healthy, smooth-walled, and limited by adhesions above. The needle was passed through the upper adhesions, but no pus was drawn off. It was then introduced through the skin over the seventh space, and pus was again struck. Evidently the case was one of localised empyema or one of abscess of the lung. To guard against the risk of infection of the lower pleura, the cavity of the wound was stuffed with sterilised gauze. Through the previous skin incision extended backwards below the angle of the scapula, 4 c.cm. of the seventh rib, and 5 c.cm. of the sixth rib were then resected. The pleura which "underlaid" the sixth rib was bulging and yellow, but no pus escaped on puncture. The needle was then passed repeatedly in various directions without result, until at last pus was struck by puncturing the bed of the seventh rib-fragment, the needle being directed inwards and slightly forwards. The needle was left in as a guide, was followed by dissecting forceps, and the wound dilated. Considerable pus and dark blood clot flowed out, with free bubbling of air. A finger was introduced into the cavity which was found to be rather smaller than a tangerine orange, and to have soft, ragged walls. During these latter manipulations bloodstained mucus was expectorated. A short rubber tube was placed in the abscess cavity, and the lower pleural wound freshly stuffed. The skin incision was mostly stitched up. In the very weak condition of the child, shock was considerable, and hypodermic injections of ether were administered during the operation, and an enema of bovril and whisky given at its close. On reflecting that, next to the shock, the great risk in the case was the danger of septic infection of the lower pleura, and thus of possible superadded empyema, I removed the skin sutures and left the wound open, to allow of accurate plugging of the lower pleural opening. Also, for fear of the drainage tube causing ulceration of any pulmonary vessel which might be in the walls of the cavity, the tube was replaced by sterilised iodoform gauze, which was the dressing employed throughout the course of the case. When the wound was being dressed air whistled and bubbled loudly in the abscess cavity. Fortunately the abscess proved to be single. Nothing eventful marked the future history of the case. The lower pleural wound was healed by May 31st, and by June 21st the child was completely cured. In the pus from the abscess cavity there was a quantity of alveolated elastic tissue, and many pneumococci and a few staphylococcus groups.

I may be allowed to indicate some points of special interest with regard to the diagnosis and treatment of the case: (1) That while a diagnosis of empyema was come to, this was in face of the fact that vocal fremitus was present throughout the right side, whereas in empyema, so far as my experience goes, the loss of vocal fremitus, along with the presence of percussion dullness, is the most constant and trustworthy sign of fluid in the pleural cavity of children. (2) That no pus was expectorated previous to the operation, and thus the diagnosis was rendered more difficult. When the gauze stuffing was removed at the "dressings" during the first few weeks some blood-stained muco-pus was usually expectorated. (3) That the systolic murmur, whose presence was noted internal to the right scapula before the operation, was found on subsequent examination, during the progress of the case, to have disappeared. The significance of this murmur was not evident, but in all probability, as the area of the murmur lay close to the site of the abscess, it was due to the bending or tension of a large pulmonary vessel by pressure of the abscess. In a similar case the discovery of such a murmur might assist in the proximate localisation of the abscess.

With regard to treatment, the case illustrates (1) the value of a large easily-manipulated syringe and exploratory needle—in this case a serum syringe—as a preliminary to rib excision, and, unless the diagnosis is beyond all doubt, as it often cannot be, the needle should be left in as a guide to the subsequent steps. Mr. Godlee¹ adversely criticises even this large form of simple syringe, and expresses his preference for the bottle aspirator. The smaller needle certainly does run the greater risk of blocking, but the simple manœuvre, which I first learnt from Mr. C. W. Cathcart, of having some sterilised fluid in the syringe before puncturing, which can be expelled to clear the needle if necessary, to some extent meets this objection, while the greater manageability of the simple syringe in the perhaps numerous attempts to hit the suspected abscess gives it a distinct advantage over the bottle aspirator. (2) The value of sterilised gauze plugging in preventing infection. (3) The superiority of gauze stuffing over the use of a drainage tube in the treatment of abscess of the

* Read before the Border Counties Branch of the British Medical Association.